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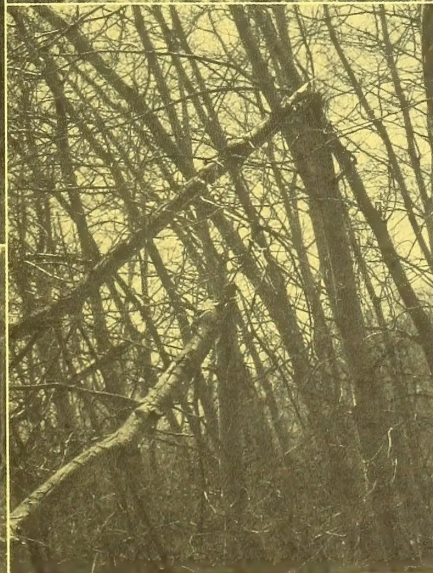
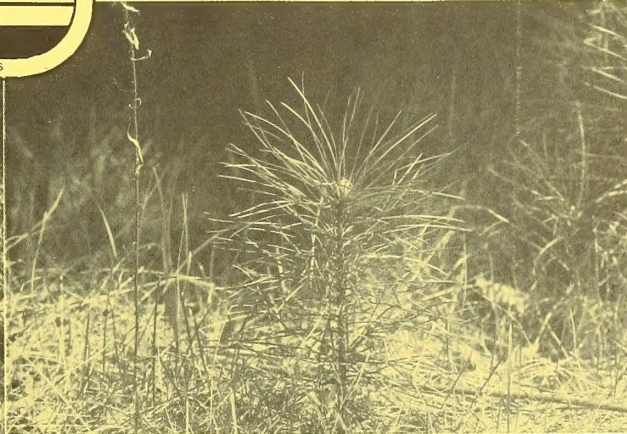
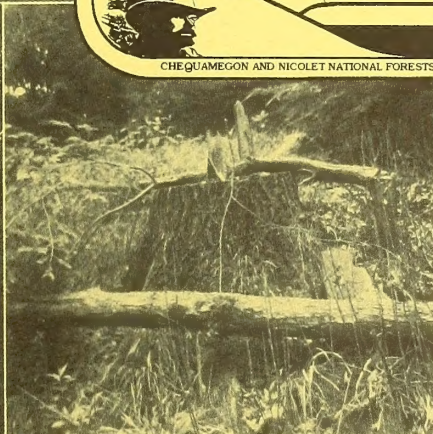
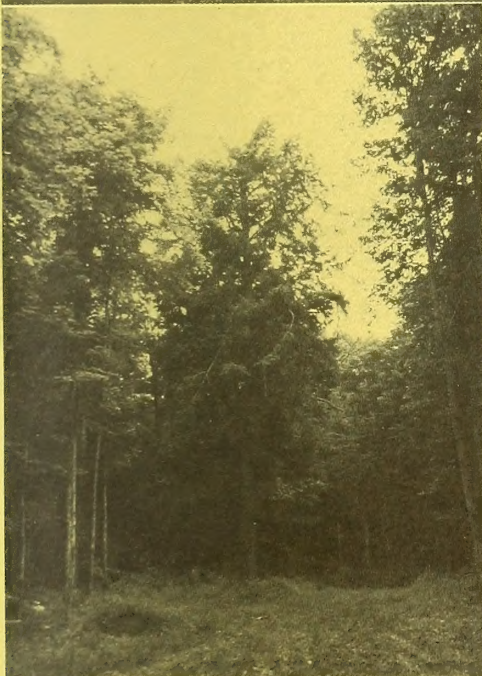
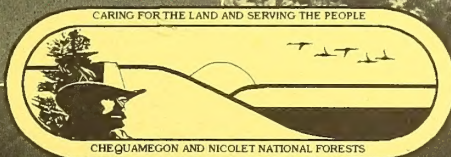
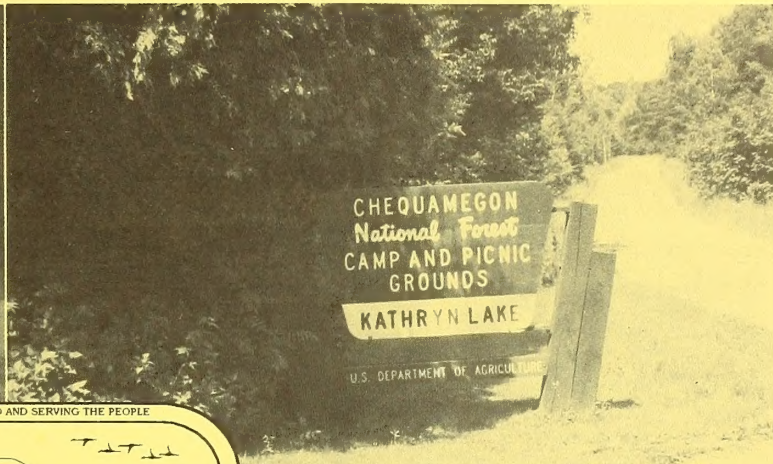
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# The Forest Resources of the Chequamegon- Nicolet National Forest

David E. Haugen, Phillip C. Freeman, and Mark A. Theisen

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David E. Haugen, Phillip C. Freeman, and Mark A. Theisen

**NOTE:** *Because of different forest inventory techniques and forest definitions used by the North Central Forest Inventory and Analysis Program and the Chequamegon-Nicolet National Forest, some of the estimates shown in this report will not always match those in the Chequamegon-Nicolet's Land and Resource Management Plan.*

*Statistics reported in this publication may not match statistics reported in other publications due to release dates of publications and the continued refinement of the statistical processes.*

In 1998, the Chequamegon National Forest in northwestern Wisconsin and the Nicolet National Forest in northeastern Wisconsin (fig. 1) were officially designated as one Forest. Headquarters for the Forest are located in both Park Falls and Rhinelander. These two land bases are both within a day's drive of more than 7 million people in the Chicago, Duluth, Green Bay, Madison, Milwaukee, and the Twin Cities metropolitan areas. For the sake of comparison with earlier inventories, the two land bases will be discussed separately in some of the following text and tables.

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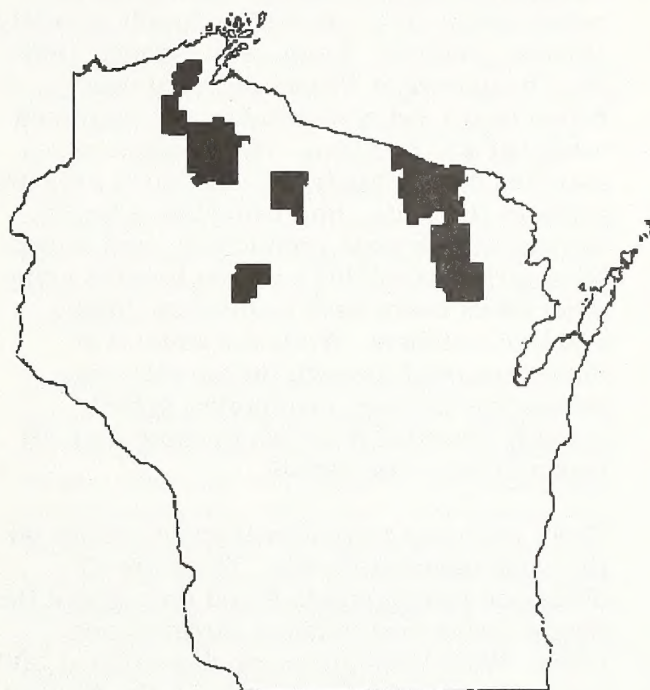


Figure 1.—Location of the Chequamegon-Nicolet National Forest.

## HISTORY

Congress created the Chequamegon and Nicolet National Forests in 1933. The National Forest in Wisconsin is comprised of tax-forfeited land purchased from State and local governments, as well as land purchased from private individuals and timber companies. Much of the area was so degraded from extensive logging and ensuing fires that it was often referred to as "stump land." The Chequamegon and Nicolet have shown a remarkable recovery since their inception and are currently providing the wide variety of benefits envisioned when they were created. Today, the Chequamegon land base consists of 859 thousand acres in Ashland, Bayfield,

Price, Sawyer, and Taylor Counties, and the Nicolet land base consists of 662 thousand acres in Florence, Forest, Langlade, Oconto, Oneida, and Vilas Counties in Wisconsin.

### **CURRENT MANAGEMENT AND BENEFITS**

Timber management is an important aspect of the overall management of the Chequamegon-Nicolet National Forest. Harvesting is used as a management tool to provide a variety of wildlife habitats, improve forest health, increase productivity, as well as supply a variety of forest products. From 1986 through 1995, the Chequamegon-Nicolet provided nearly 1.4 billion board feet of sawtimber and pulpwood valued at \$37.5 million. This value is compounded by the number of jobs forest industry provides the State. Improving forest health, increasing pulpwood productivity, and providing a variety of wildlife habitats benefits many other forest users such as hunters, hikers, and bird watchers. While the amount of timber removed through timber sales was substantial between inventories, growth actually exceeded removals by more than 10 percent during the period.

There are many recreational opportunities on the Chequamegon-Nicolet. There are 47 developed campgrounds found throughout the Forest—most next to lakes, streams, and rivers. With 2,000 lakes and more than 1,300 miles of cold water trout streams, the Forest offers many opportunities for boating, fishing, swimming, and canoeing. The Nicolet land base, known as the “Cradle of Rivers,” is the headwaters of the Wolf, Pine, Popple, Oconto, Peshtigo, Deerskin, and Wisconsin Rivers.

The road system on the Chequamegon-Nicolet gives visitors access to recreational areas and scenic attractions. The Lakewood Auto Tour, Heritage Scenic Byway, and the Great Divide Scenic Byway offer visitors a chance to enjoy the Forest’s wildlife and scenic beauty.

Hunting opportunities abound. The area is known for its quality hunting that includes trophy-size deer, abundant black bear, duck, and grouse. In fact, Park Falls is known as the ruffed grouse capital of the world. Many miles of hunter walking trails provide access into prime habitat. For those who enjoy a

wilderness experience, five designated wilderness areas amounting to 44 thousand acres are on the Forest.

Among the many hiking trails, the North Country Trail, the Franklin Lake Trail, and the Ice Age Trail offer some of the most beautiful scenery found in the North-central United States. The Anvil Trail Wildlife Area, Moquah Pine Barrens, and other unique areas offer great places to view wildlife. In total, there are more than 1,400 miles of trails for hiking, mountain biking, horseback riding, snowmobiling, cross-country skiing, and ATV’s. All of these resources make the Chequamegon-Nicolet National Forest a prime area for outdoor recreation.

### **FOREST LAND CLASSES ON THE NATIONAL FOREST**

Of the 1.5 million total acres of Chequamegon-Nicolet National Forest lands, 94 percent are forested. The remaining nonforest areas consist of natural openings such as lowland shrubs, wetlands, sedge meadows, and grasslands, as well as developed land such as roads and utility corridors. The Chequamegon land base currently has 786 thousand acres of forest land, an increase of 1 percent since 1983. The Nicolet land base currently has 637 thousand acres of forest land, an increase of 5 percent between the 1983 and 1996 inventories. The main reason forest land has increased is the conversion of nonforest land to forest land. Land that was classified nonforest land in the 1983 inventory later met the requirements to be classified as forest land in the 1996 inventory due to the substantial ingrowth of trees on these lands between inventories.

The Chequamegon-Nicolet is productive: 96 percent of all forest lands have the potential to annually produce 20 or more cubic feet of wood per acre per year. The forest land area can be divided into three major land classes: timberland, reserved timberland, and other forest land. The Chequamegon land base has 766 thousand acres in timberland, 7 thousand acres in reserved timberland, and 13 thousand acres in other forest land. The Nicolet land base has 599 thousand acres in timberland, 37 thousand acres in reserved timberland, and 1 thousand acres of other forest land.

## FOREST COMPOSITION

The Chequamegon-Nicolet National Forest has an abundant variety of tree species that can be attributed to many factors including varied soil types, geological formations, climate, hydrological conditions, fire, and other natural/or human-caused disturbances. This variety of tree species contributes to the ecological diversity of the entire Forest.

Coniferous forest types on the Chequamegon-Nicolet decreased in area between inventories (fig. 2). In 1983, the Chequamegon had approximately 222 thousand acres of coniferous forest types. However, by 1996, the area in coniferous forest types had decreased by 18 percent to 182 thousand acres. In 1983, the Nicolet had approximately 163 thousand acres of coniferous forest types, but by 1996, the area in coniferous forest types had decreased by 4 percent to 156 thousand acres.

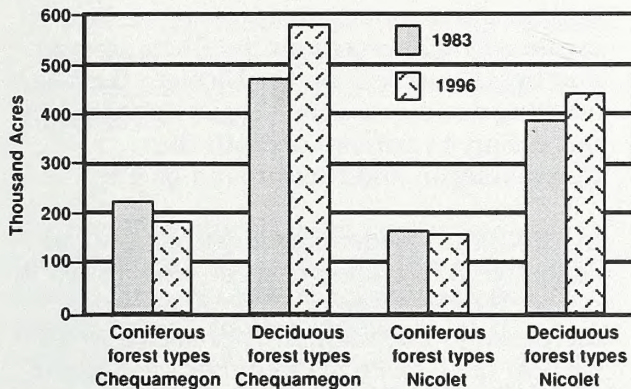


Figure 2.—Area of timberland, by coniferous and deciduous forest types, on the Chequamegon-Nicolet National Forest, 1983 and 1996.

Although both land bases showed decreases in many of the same coniferous forest types (jack pine, red pine, balsam fir, and northern white-cedar) the size of the decreases tended to be higher on the Chequamegon. Much of this can be attributed to the change in area due to forest harvesting levels, forest succession, and the Chequamegon's larger area in these forest types. For example, the jack pine forest type decreased by more than 51 percent on the Chequamegon, while the Nicolet showed a decrease of 32 percent. In 1983, the Chequamegon had an estimated 39

thousand acres and the Nicolet had 11 thousand acres of jack pine forest type. By 1996, the area of jack pine forest type had decreased to 19 thousand acres on the Chequamegon and to 7.5 thousand acres on the Nicolet.

Deciduous forest types increased in area between inventories (fig. 2). The Chequamegon had a 23-percent increase in deciduous forest types between inventories, rising from 472 thousand acres to 582 thousand acres. The Nicolet had a 14-percent increase, rising from 386 thousand to 441 thousand acres. The oak-hickory forest type was the only forest type to decrease in area of timberland on both the Chequamegon and Nicolet land bases. Although some of the decrease was due to harvesting, more was likely due to a change from oak-hickory forest type to maple-basswood forest type with oak-hickory as a major component of the maple-basswood type.

Decreases in area also occurred in white spruce on the Chequamegon and in aspen on the Nicolet between inventories. Examples of forest types that increased in area of timberland between the 1983 and 1996 inventories include white pine, black spruce, tamarack, and maple-basswood. In the 1983 inventory, balsam poplar was included in the aspen forest type, but in the 1996 inventory, balsam poplar was a separate forest type.

The changes occurring can be primarily attributed to the on-going successional processes taking place on forested lands. Besides natural succession, other factors such as forest pest outbreaks (i.e., spruce bud worm), animal damage (deer browse and beaver dams flooding northern white-cedar), harvesting patterns, and reductions in planting programs have affected forest composition.

One way to look at the forest resource is by analyzing stand-size class (fig. 3). We classify forest land into three size classes based on the average diameter at breast height (d.b.h.) of the predominant trees within the stand. The three size classes are sapling/seedling—trees between 1 and 5 inches d.b.h.; poletimber—trees between 5 and 9 inches d.b.h. for coniferous and 5 and 11 inches d.b.h. for deciduous; and sawtimber—trees more than 9 inches d.b.h. for coniferous and more than 11 inches d.b.h. for deciduous.

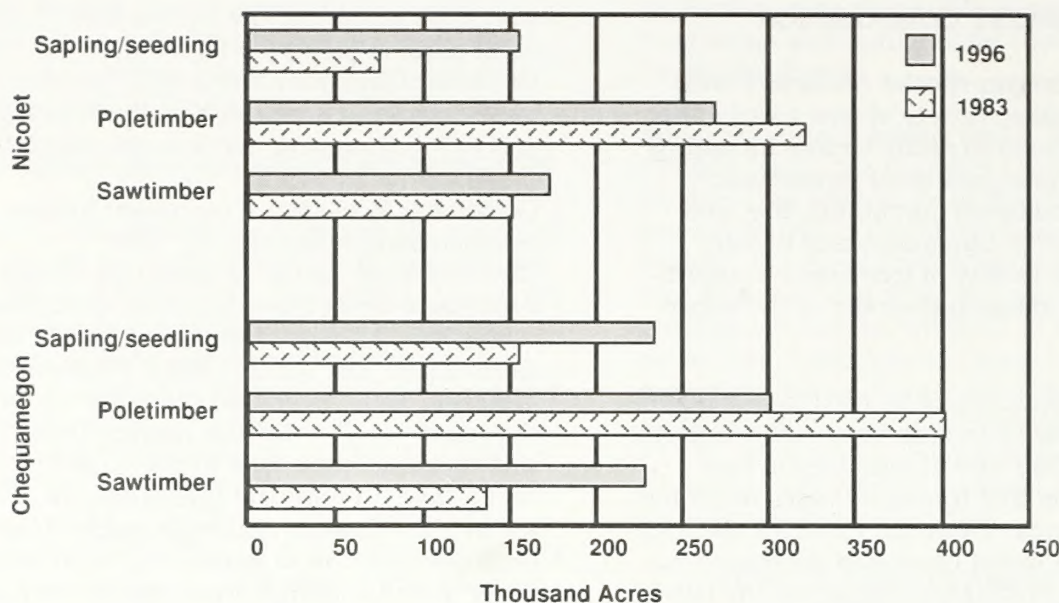


Figure 3.—Area of timberland in 1983 and 1996 on the Chequamegon-Nicolet National Forest by stand-size class.

Between inventories, the area of poletimber-size stands decreased, while sapling/seedling and sawtimber-size stands increased in area on both land bases. The decrease in poletimber-size stands can be attributed partly to the maturing of the forest. The area of poletimber-size stands decreased by 25 percent on the Chequamegon and by 17 percent on the Nicolet. Most of the decline in poletimber occurred in coniferous forest types. Between inventories, coniferous poletimber-size forest types decreased by 59 percent on the Chequamegon and by 46 percent on the Nicolet. Deciduous poletimber-size stands decreased in area by only 13 and 6 percent, respectively, between inventories.

The area of sawtimber-size stands increased by 68 percent on the Chequamegon and by 14 percent on the Nicolet. Most of the increases in sawtimber occurred in deciduous forest types—a 157-percent increase on the Chequamegon and a 43-percent increase on the Nicolet. Coniferous sawtimber-size stands on both land bases decreased between inventories. The Chequamegon decreased by 9 percent and the Nicolet decreased by 28 percent.

Between inventories, the area of sapling/seedling size stands increased by 50 percent on the Chequamegon and by 107 percent on the Nicolet. Both coniferous and deciduous

forest types in the sapling/seedling stand-size classes increased between inventories. Sapling/seedling coniferous forest types increased by 65 percent on the Chequamegon and by 310 percent on the Nicolet. Sapling/seedling deciduous forest types increased by more than 44 percent on both the Chequamegon and Nicolet land bases.

In 1983, the Chequamegon-Nicolet had an estimated 877 million trees at least 1 inch in d.b.h. By 1996, the number of trees had increased to 968 million, approximately 10 percent of all the trees found in the State of Wisconsin.

The most prevalent conifer documented during the 1996 inventory was the balsam fir. Other coniferous species found in abundance include black spruce, white spruce, northern white-cedar, and red pine. White pine trees growing on the Chequamegon-Nicolet increased between inventories. In 1983, the Nicolet had an estimated 859 thousand white pine trees; by 1996, the number of white pine trees had increased to more than 2.1 million. Likewise, on the Chequamegon, white pine increased from an estimated 2.6 million trees in 1983 to 3.5 million trees in 1996.

Quaking aspen was the most prevalent deciduous tree species. Other abundant deciduous species include sugar maple, red maple, and black ash.

Growing-stock volume increased on the Chequamegon-Nicolet between inventories (fig. 4). In 1996, the Chequamegon had 1 billion cubic feet in growing-stock volume on timberland, an increase of 17 percent since the 1983 inventory. The Nicolet had an estimated 883 million cubic feet of growing-stock volume in 1996, an increase of 11 percent since the 1983 inventory.

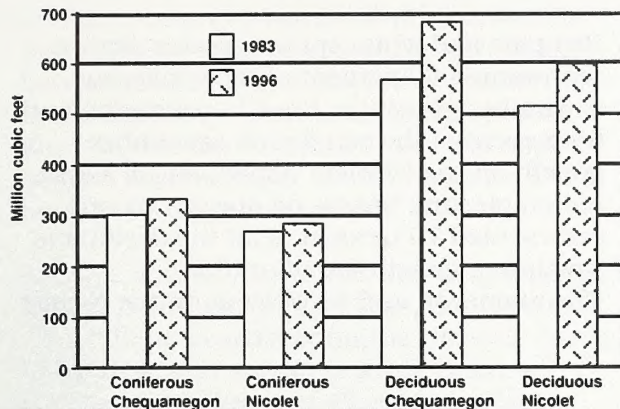


Figure 4.—Growing-stock volume by coniferous and deciduous forest types on the Chequamegon-Nicolet National Forest, 1983 and 1996.

Between inventories, both coniferous and deciduous growing-stock volume increased on both land bases. On the Chequamegon, growing-stock volume increased by 10 percent for coniferous species and by 20 percent for deciduous species. On the Nicolet, growing-stock volume increased by 6 percent for coniferous species and by 17 percent for deciduous species.

In 1983, on the Chequamegon, red pine, northern white-cedar, and white pine species groups made up 40 percent of the growing-stock volume for conifers; in 1996, the same species groups made up 52 percent. Although growing-stock volume increased between inventories for most of the conifer species found on the Chequamegon, jack pine (-61 percent) and white spruce (-43 percent) growing-stock volume decreased.

The decline in jack pine growing-stock volume may reflect the maturing of the Chequamegon land base.

In 1983, sugar maple, aspen, and red maple species groups made up 56 percent of all deciduous growing-stock volume on the Chequamegon. By 1996, sugar maple, aspen, and red maple species groups made up 62 percent of all deciduous growing-stock volume.

Volume of sawtimber on the Chequamegon increased by 73 percent between inventories, rising from an estimated 1.6 billion board feet in 1983 to 2.7 billion board feet in 1996. Coniferous sawtimber volume increased by 55 percent and deciduous sawtimber volume increased by 93 percent between inventories.

In 1996, on the Nicolet, red pine, northern white-cedar, and hemlock species groups made up 58 percent of the total volume in growing-stock for conifers, an increase of 5 percent from 1983, when the same species groups made up 53 percent of the total conifer volume. Between inventories, jack pine volume decreased by 49 percent and balsam fir decreased by 27 percent. These decreases may indicate that the Nicolet land base is maturing, going through successional change.

In 1996, on the Nicolet, sugar maple, aspen, and basswood species groups made up 72 percent of all deciduous growing-stock volume; this was not much of a change from 1983, when the same species groups made up 70 percent of all deciduous growing-stock volume. At -87 percent, the elm species group had the largest decrease of any deciduous species group, due in part to the devastation caused by Dutch elm disease over the past decade.

Volume of sawtimber on the Nicolet increased by 47 percent between inventories, rising from an estimated 1.6 billion board feet in 1983 to 2.3 billion board feet in 1996. Coniferous sawtimber volume increased by 26 percent and deciduous sawtimber volume increased by 67 percent.

The increase of sawtimber volume on both the Chequamegon and Nicolet land bases is a sign that the Forest is maturing as indicated by the stand-size class structure (i.e., poletimber growing into small sawtimber). The increase in sawtimber volume may also indicate a change in the harvesting levels on the Forest.

## CAUSES OF CHANGE

Both internal and external forces shape and influence the characteristics of the Chequamegon-Nicolet National Forest. One of the main goals of a forest inventory is to collect and analyze data pertaining to changing factors related to growth, mortality, and removals.

### Growth

On the Chequamegon and Nicolet, average annual net growth of growing stock was 23.7 million and 20.5 million cubic feet per year, respectively, between 1983 and 1996. On a per acre basis, the Chequamegon averaged 31 cubic feet per year in average annual net growth and the Nicolet averaged 34 cubic feet per year in average annual net growth on timberland. This compares to a statewide average for Wisconsin of 31 cubic feet per year in average annual net growth per acre on timberland.

Net annual growth of sawtimber on the Chequamegon and Nicolet averaged 98.9 and 79.1 million board feet per year, respectively. On a per acre basis, the Chequamegon averaged 129 board feet per acre per year and the Nicolet averaged 132 board feet per acre per year (the overall state-wide average for Wisconsin was 107 board feet per acre per year).

On the Chequamegon, conifer species groups averaged 7.5 million cubic feet and deciduous species groups averaged 16.2 million cubic feet of average annual net growth of growing stock per year between inventories (fig. 5). Red pine, white spruce, and white pine made up 73 percent of the average annual net growth for conifer species, while sugar maple, aspen, and red maple made up 72 percent of the average annual net growth for deciduous species groups.

On the Nicolet, coniferous species groups averaged 6.6 million cubic feet and deciduous species groups averaged 13.9 million cubic feet of average annual net growth of growing stock per year between inventories. Red pine, white spruce, and northern white-cedar made up 80 percent of the average annual net growth for conifer species, while sugar maple, aspen, red maple, and basswood made up 89

percent of all the average annual net growth for deciduous species groups.

On the Chequamegon, the annual net growth of coniferous and deciduous sawtimber averaged 41.0 million board feet and 57.9 million board feet, respectively. On the Nicolet, coniferous species groups averaged 30.6 million board feet and deciduous species groups averaged 48.5 million board feet of sawtimber annual net growth.

Red pine and white spruce species groups represented 60 percent of the coniferous sawtimber growth on the Chequamegon and 68 percent of the coniferous sawtimber growth on the Nicolet. Aspen, sugar maple, red maple, and basswood species groups represented 75 percent of all the deciduous sawtimber growth found on the Chequamegon and 84 percent on the Nicolet.

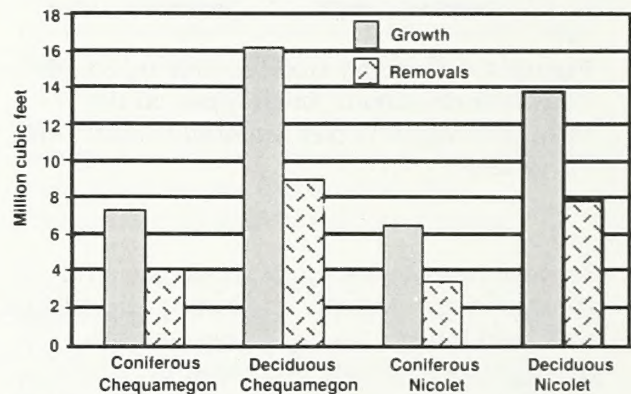


Figure 5.—Average annual net growth and average annual removals of growing stock on timberland on the Chequamegon-Nicolet National Forest, 1983-1996.

### Mortality

Tree mortality has often been viewed as a loss of valuable wood fiber, but mortality plays an important role in how a forest ecosystem develops. Dead and dying trees provide valuable wildlife habitat. For example, many native longhorned wood-boring beetles in the larval stage use dead trees to live and feed on. The beetles play an important role as decomposers in the forest ecosystem.

The causes of mortality on the Chequamegon-Nicolet included diseases such as hypoxylon

canker, Dutch elm, verticillium wilt, and white trunk rot; insects such as budworm, bole borers, and ips beetle; animals such as beaver, deer, and porcupine; and weather-related factors such as wind, ice, and drought.

Between inventories, average annual mortality of growing stock on the Chequamegon and Nicolet was 9.5 and 9.2 million cubic feet, respectively. Deciduous species groups accounted for two-thirds of all mortality on both the Chequamegon and Nicolet. Aspen, balsam fir, and sugar maple accounted for more than 50 percent of all growing-stock mortality on the Chequamegon, and aspen, balsam fir, and paper birch accounted for more than 50 percent on the Nicolet.

Average annual sawtimber mortality was 22.3 million board feet on the Chequamegon and 19.5 million board feet on the Nicolet. Aspen, balsam fir, and northern white-cedar accounted for more than 45 percent of all sawtimber mortality on the Forest. What really is significant is that aspen accounts for more than 21 percent of all sawtimber mortality on the Chequamegon and more than 23 percent on the Nicolet.

Mortality provides a picture of the successional changes that take place as a forest matures (early-successional species being replaced by mid-successional to late-successional species). In general, higher rates of mortality can occur in the early-successional forest types like aspen, jack pine, and balsam fir if mortality is not captured; in other words, harvesting trees for wood fiber before they become overmature.

### **Removals**

Total annual removals of growing stock from timberland averaged 13.2 million cubic feet on the Chequamegon and 11.5 million cubic feet on the Nicolet between inventories. Sawtimber removals for the Chequamegon and Nicolet averaged 23.5 and 30.2 million board feet per year, respectively.

Deciduous species accounted for 69 percent of all growing-stock removals on the Forest. The aspen species group accounted for 31 percent of all growing-stock removals on the Chequamegon and 28 percent on the Nicolet. Although aspen continues to be in high

demand and Wisconsin's pulpwood market remains strong, aspen use is slowly declining in favor of pine as well as birch and other hardwoods (Hackett and Whipple 1995).

On the Chequamegon, the top five species for removals were aspen, red oak, white spruce, sugar maple, and red pine, which annually accounted for more than 8.6 million cubic feet or 65 percent of all growing-stock removals.

On the Nicolet, the top five species for removals were aspen, sugar maple, white pine, balsam fir, and paper birch, which annually accounted for more than 7.7 million cubic feet or 67 percent of all growing-stock removals.

Average annual sawtimber removals for deciduous species groups on the Chequamegon and Nicolet accounted for 51 percent and 62 percent of the total removals per year, respectively.

The aspen species group accounted for 24 percent of all sawtimber removals on the Chequamegon and 31 percent on the Nicolet (aspen sawtimber removals for the entire State averaged 21 percent).

On the Chequamegon, the top five species for sawtimber removals were aspen, red pine, white spruce, jack pine, and balsam fir, which annually accounted for more than 16.7 million board feet of sawtimber removals. Aspen made up 47 percent of all deciduous sawtimber removals, while red pine made up 26 percent of all coniferous sawtimber removals.

On the Nicolet, the top five species for sawtimber removals were aspen, white pine, sugar maple, red pine, and elm, annually accounting for more than 21.0 million board feet of sawtimber removals. Aspen made up half of all deciduous removals, while white pine made up 49 percent of all coniferous removals.

These numbers reflect the variety of wood fiber harvested from the Forest and the important role harvesting plays in forest management. The flow of wood fiber from the Chequamegon-Nicolet plays an important economic role both locally and regionally.

## APPENDIX

### RELIABILITY OF THE SURVEY

Forest Inventory and Analysis information is based on a sampling procedure designed to provide reliable statistics at the State and Survey Unit levels. Consequently, the reported figures are estimates only. A measure of reliability of these figures is given by sampling errors (table A). These sampling errors mean that the chances are two out of three that if a 100-percent inventory had been made, using the same methods, the results would have been within the limits indicated.

For example, the estimated growing-stock volume on the Chequamegon in 1996, 1,015.8 million cubic feet, has a sampling error of  $\pm 3.36$  percent ( $\pm 34.1$  million cubic feet). The growing-stock volume from a 100-percent inventory would be expected to fall between 981.7 million cubic feet and 1,049.9 million cubic feet ( $1,015.8 \pm 34.1$ ), there being a one in three chance that this is not the case.

Table A.—Sampling errors for the 1996 inventory of the Chequamegon-Nicolet National Forests

| Item                                   | Chequamegon totals        | Sampling error |
|----------------------------------------|---------------------------|----------------|
| Growing stock                          | <i>Million cubic feet</i> | <i>Percent</i> |
| Volume (1996)                          | 1,015.8                   | 3.36           |
| Average annual growth<br>(1983-1995)   | 23.7                      | 6.35           |
| Average annual removals<br>(1983-1995) | 13.2                      | 14.81          |
| Sawtimber                              | <i>Million board feet</i> |                |
| Volume (1996)                          | 2,737.4                   | 4.42           |
| Average annual growth<br>(1983-1995)   | 98.9                      | 6.72           |
| Average annual removals<br>(1983-1995) | 23.5                      | 17.73          |
|                                        | <i>Thousand acres</i>     |                |
| Timberland area (1996)                 | 766.0                     | 1.43           |
| Item                                   | Nicolet totals            | Sampling error |
| Growing stock                          | <i>Million cubic feet</i> | <i>Percent</i> |
| Volume (1996)                          | 883.7                     | 3.74           |
| Average annual growth<br>(1983-1995)   | 20.5                      | 6.96           |
| Average annual removals<br>(1983-1995) | 11.5                      | 22.67          |
| Sawtimber                              | <i>Million board feet</i> |                |
| Volume (1996)                          | 2,326.8                   | 5.17           |
| Average annual growth<br>(1983-1995)   | 79.1                      | 7.64           |
| Average annual removals<br>(1983-1995) | 30.2                      | 24.10          |
|                                        | <i>Thousand acres</i>     |                |
| Timberland area (1996)                 | 599.4                     | 1.65           |

As survey data are broken down into sections smaller than Forest totals, the sampling error increases. For example, the sampling error for timberland area in a particular forest type is higher than that for total timberland area in the Forest. To estimate sampling error for data smaller than Forest totals, use the following formula:

$$E = \frac{(SE) \sqrt{(\text{Forest total volume or area})}}{\sqrt{(\text{Volume or area smaller than Forest total})}}$$

Where :

E = Sampling error in percent.

SE = Forest total error for volume or area.

For example, to compute the error on the area of timberland in the maple-beech-birch type for the Nicolet, proceed as follows:

- 1) Total area of maple-beech-birch type = 258.8 thousand acres.
- 2) Total Forest area of all timberland = 599.4 thousand acres.
- 3) Total Forest error for timberland area = 1.65 percent.
- 4) Using the above formula:

$$E = \frac{0.0165 \sqrt{599.4}}{\sqrt{258.8}}$$

E = 0.0255 or 2.55 percent sampling error for the maple-beech-birch forest type on the Nicolet.

## SURVEY PROCEDURES

The 1996 Wisconsin survey used a growth model-enhanced, two-phase sample design. Using this sampling scheme and associated estimators is similar to sampling with partial replacement, in that a set of randomly located plots is available for remeasurement and a random set of new plots is established and measured. A feature of the new Wisconsin design is stratification for disturbance on the old sample and use of a growth model to improve regression estimates made on old undisturbed forest plots (fig. 6). Detailed descriptions of the sampling and estimation procedures are presented by Hansen (1990). The growth model used in the Wisconsin survey design was the Lake States Stand and Tree Evaluation and Modeling System (STEMS) (Belcher *et al.* 1982).

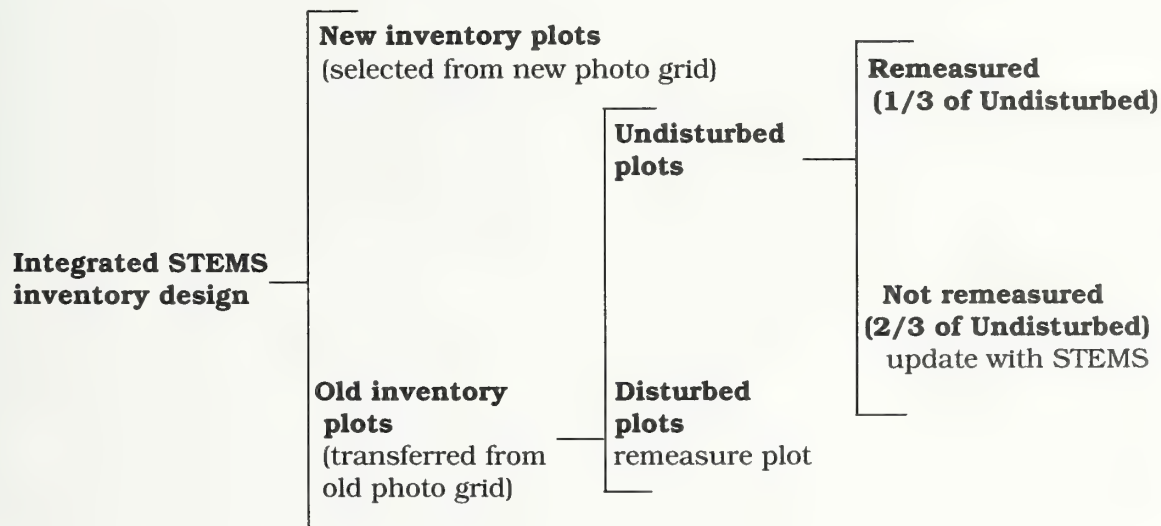


Figure 6.—Overview of the Wisconsin sample design.

## Major Steps in the New Survey Design

### 1. Aerial photography (Phase 1)

In this phase, two sets of random points were located on current aerial photography. The first is a set of new photo plots and the second is a set of relocated old ground plot locations from the 1983 inventory. Phase 1 aerial photographs, taken from 1991 through 1993, were black and white, infrared at a scale of 1:15,840 for the Northeast, Northwest, and Central Survey Units and at a scale of 1:24,000 for the Southeast and Southwest Survey Units. The Wisconsin Department of Natural Resources contracted for this photography and loaned the photos to the Forest Service. The locations of plots used in the 1983 inventory were transferred to these new photographs. The photographs were then assembled into township mosaics, and a systematic grid of 121 one-acre photo plots (each plot representing approximately 190.4 acres) was overlaid on each township mosaic. Each of these photo plots was examined by aerial photo interpretation specialists and classified stereoscopically based on land use. If trees were present, forest type and stand-size/density class were recorded. After this examination, all the old "disturbed" sample locations and one-third of the old "undisturbed" forested plots were sent to the field for survey crews to verify the photo classification and to take further measurements. All photo plot locations for the 1996 inventory were examined and were classified as shown in table B.

Table B.—*Photo plot classifications, 1996 inventory of Chequamegon-Nicolet forest resources*

| Photo land class        | Photo plots |
|-------------------------|-------------|
| Forest land             | 7,433       |
| Reserved forest land    | 195         |
| Questionable            | 81          |
| Nonforest with trees    | 106         |
| Nonforest reserved      | -           |
| Nonforest without trees | 505         |
| Water                   | -           |
| All classes             | 8,320       |

A systematic sample of the aerial photo plots was selected to become ground plots in phase

2 of the procedure. Ground plots that definitely were not forest land were given a nonforest ground land-use classification and not sent to the field for measurement.

### 2. Plot measurements (Phase 2) —Overview of 1983 plot design

On plots classified as timberland, wooded pasture, or windbreak (at least 120 feet wide), a ground plot was established, remeasured, or modeled. Old plots sent to the field for remeasurement that could not be relocated were replaced with a new plot at the approximate location of the old one. Each ground plot consisted of a cluster of 10 subplots covering approximately 1 acre. At each subplot, trees 5.0 inches or more in d.b.h. were sampled on a 37.5 Basal Area Factor (BAF) variable-radius plot, and trees less than 5.0 inches d.b.h. were sampled on a 1/300-acre fixed-radius plot only at subplots 1, 2, and 3. Under the estimation procedures used in this inventory, the entire plot measurement represented a single land classification. Thus, if a subplot was located outside of the land classification for the plot, it was rotated back into the land classification. For example, if subplots 1 through 9 were located in a forest land classification and subplot 10 fell in a pasture, subplot 10 was rotated back into the forest land classification.

### Plot measurements (Phase 2)—Overview of 1996 plot design

On plots of forest land (including reserved forest land, unproductive forest land, and timberland), wooded pasture, or windbreaks (at least 120 feet wide), a ground plot was established, remeasured, or modeled. Locating ground plots on all forest lands in 1996 represented a major change from the 1983 inventory.

In 1996, the overall plot layout consisted of 10 subplots arranged in a cluster with 70 feet between clusters. The basic location of plots and subplots was the same as in the 1983 plot layout. All trees less than 5 inches in d.b.h. were measured on ten 6.8-foot radius (1/300 acre) circular microplots located at the center of each subplot. (In 1983, this microplot was measured only on subplots 1, 2, and 3.) This radius was the maximum distance at which a 5-inch tree would be selected using a 37.5

BAF prism. Trees with diameters between 5 and 17 inches were selected at each of the 10 subplots with a BAF of 37.5. Trees greater than 17 inches d.b.h. were selected from a 24-foot fixed-radius macro-subplot centered at each of the 10 subplots. The macro subplots were mapped for forest conditions, and subplots were not rotated even if they fell into another condition. Factors that would determine a change in condition from subplot 1 were changes in forest type, stand-size class, land use, ownership, and density. Each condition that occurred anywhere on one of the subplots was identified, described, and mapped. Each condition was assigned a condition number, and condition information was recorded.

On remeasurement plots, the rotated subplots and all the trees measured on the 1983 plot design were also measured to obtain change data such as growth and mortality. On new plots, subplots were not rotated. Hahn *et al.* (1995) present further in-depth procedures.

#### a) New inventory plots

A systematic sample of the new photo plots was selected for field measurement. Ground plots were established, and measures of current classification such as land use, forest type, and ownership as well as size and condition of all trees on the plot were recorded. These locations were monumented for future remeasurement.

#### b) Old inventory plots

These plots were established, monumented, and measured as part of the 1983 field inventory. The procedures for these old plots were different from those for the new plots. Old plots were classed as “undisturbed” or “disturbed” in the aerial photo phase of the sampling process. All disturbed plots and a one-third sample of the undisturbed plots were remeasured to obtain estimates of current condition and changes since the last inventory. All trees measured on these plots in 1983 were remeasured or otherwise accounted for, and all new trees were identified and measured.

All sample plots that were timberland at the time of the 1983 inventory and determined to be undisturbed until this inventory were projected to the current time using STEMS. This procedure gives projected estimates of current volume and growth for these undisturbed plots. The comparison of the projected and observed values on the one-third sample of the undisturbed forest plots that were remeasured provided local calibration data to adjust the projected values of the undisturbed plots that were not remeasured. The adjustment procedure is a modified version of the method described by Smith (1983).

The undisturbed timberland plots that were not remeasured play a crucial role in the new survey design. These plots were determined to be undisturbed and had conditions that could be simulated by STEMS. The STEMS growth model was used to “grow” the old plot and tree data to produce an estimate of current data. Thus, these plots were treated as ground plots, even though they were never visited. The plot record for each modeled plot was sent to the field for verification of current ownership information.

All old plots classified as disturbed were sent to the field for remeasurement to assess and verify changes since the last inventory. Disturbance refers to any change on a plot that can be detected on aerial photos and that the STEMS growth processor cannot predict, such as catastrophic mortality, cutting, regenerating stands, and land-use change.

The estimation procedure for computing statistics from this sampling design was more complicated than the simple two-phase estimation procedure used in the past. In fact, this procedure yielded two independent samples, one coming from the new photo points and the other from the old photo points that are remeasured or modeled. Table C summarizes the distribution of all ground plots for the new inventory design by type of plot.

Table C.—Distribution of ground plots for the 1996 inventory of Chequamegon-Nicolet forest resources

| Ground land-use class   | Old plots<br>remeasured | Old plots<br>updated | New plots | Total plots |
|-------------------------|-------------------------|----------------------|-----------|-------------|
| Timberland              | 299                     | 32                   | 390       | 721         |
| Reserved forest land    | 4                       | 0                    | 11        | 15          |
| Other forest land       | 4                       | 0                    | 2         | 6           |
| Nonforest with trees    | 3                       | 4                    | 4         | 11          |
| Nonforest without trees | 23                      | 14                   | 25        | 62          |
| Water                   | 0                       | 2                    | 1         | 3           |
| Total                   | 333                     | 52                   | 433       | 818         |

### 3. Area estimates

Area estimates were made using two-phase estimation methods. In this type of estimation, a preliminary estimate of area by land use is made from the aerial photographs (Phase 1) and corrected by the plot measurements (Phase 2). A complete description of this estimation method is presented by Loetsch and Haller (1964).

### 4. Volume estimates

Estimates of volume per acre were made from the trees measured or modeled on the 10-point plots. Estimates of volume per acre were multiplied by the area estimates to obtain estimates of total volume. Net cubic foot volumes were based on a modification of the method presented by Hahn (1984) for use in the Lake States. For the Wisconsin inventory, the merchantable height equation presented in Hahn (1984) was used in conjunction with Stone's equation (see Appendix I in Hahn 1984) to estimate gross volume. This estimate was then corrected by species for variation in bark and cull volume to yield an estimate of net volume, using the coefficients presented in Hahn (1984).

The Forest Service reports all board foot volume in International 1/4-inch rule. In Wisconsin, the Scribner log rule is commonly used. Scribner log rule conversion factors were derived from full tree measurements taken throughout the Lake States (Michigan, Wisconsin, and Minnesota) and an equation developed by Wiant and Castenaeda (1977). The factors (multipliers) used to convert board foot International rule volumes to the Scribner rule are shown in the following tabulation:

| D.b.h.<br>(inches) | Scribner rule conversion factor |           |
|--------------------|---------------------------------|-----------|
|                    | Softwoods                       | Hardwoods |
| 9.0-10.9           | 0.7830                          | —         |
| 11.0-12.9          | 0.8287                          | 0.8317    |
| 13.0-14.9          | 0.8577                          | 0.8611    |
| 15.0-16.9          | 0.8784                          | 0.8827    |
| 17.0-18.9          | 0.8945                          | 0.8999    |
| 19.0-20.9          | 0.9079                          | 0.9132    |
| 21.0-22.9          | 0.9168                          | 0.9239    |
| 23.0-24.9          | 0.9240                          | 0.9325    |
| 25.0-26.9          | 0.9299                          | 0.9396    |
| 27.0-28.9          | 0.9321                          | 0.9454    |
| 29.0+              | 0.9357                          | 0.9544    |

### 5. Growth and mortality estimates

On remeasured plots, estimates of growth and mortality per acre come from the remeasured diameters of trees and from observation of trees that died between inventories. These estimates are based on the remeasurement of the 1983 inventory plots using the 1983 plot design. Growth reported as the average net annual growth between the two inventories (1983 and 1996) is computed from data on remeasured plots and modeled plots using methods presented by Van Deusen *et al.* (1986). Mortality is also average net annual for the remeasurement period. On new plots, estimates of growth and mortality were obtained by using STEMS to project the growth and mortality of trees for 1 year. Growth and mortality estimates for old undisturbed plots that were updated were derived in the same manner as remeasured plots. The STEMS growth model was adjusted by Survey Unit to meet local conditions, using data from the undisturbed remeasurement plots. As with volume, total growth and mortality estimates were obtained by multiplying the per acre

estimates by area estimates. Current annual growth for 1995 was computed by using the adjusted STEMS model to grow all current inventory plots for 1 year.

#### 6. Average annual removals estimates

Average annual growing-stock and sawtimber removals (1983 to 1995) were estimated only from the remeasured plots (these estimates are based on the remeasurement of the 1983 inventory plots using the 1983 plot design); new plots and STEMS-projected plots were not used to estimate removals. These estimates were obtained from trees measured in the last survey and cut or otherwise removed from the timberland base. Because remeasurement plots make up about one-half of the total ground plots and not all remeasurement plots had cutting, average annual removals estimates have greater sampling errors than volume and growth estimates.

### **TREE AND LOG GRADES**

Log grades and tree grades are based on the classification of external characteristics as indicators of quality. Log grades and or tree grades were taken on approximately one-third

of the sample plots in Wisconsin. All sawtimber softwood sample trees were graded for quality and assigned a butt log grade. All sawtimber hardwood sample trees were graded for quality and assigned a tree grade. The volume yield by log grade or tree grade for this sample was used to distribute the volume of the ungraded sample trees by species group.

Hardwood sawtimber trees were graded according to *Hardwood Tree Grades for Factory Lumber* (Hanks 1976). The best 12-foot section of the lowest 16-foot hardwood log was used for grading. Hardwood sawtimber trees that did not meet minimum tree grade specifications for grades 1 through 3 were assigned grade 4 according to Forest Service standard specifications for hardwood construction logs described in *A Guide to Hardwood Log Grading* (Rast *et al.* 1973).

Red pine and jack pine sawtimber trees were graded based on specifications described in *Forest Service Log Grades for Southern Pines* (Campbell 1964). White pine and other softwood sawtimber trees were graded according to specifications described by Ostrander and Brisbin (1971). For all softwoods, the first merchantable 16-foot log, or shorter lengths down to 12 feet, was used for grading.

## Hardwood Tree Grade for Factory Lumber <sup>a</sup>

| Grade factor                                                                                             | Tree grade 1          | Tree grade 2       | Tree grade 3 |
|----------------------------------------------------------------------------------------------------------|-----------------------|--------------------|--------------|
| Length of grading zone (feet)                                                                            | Butt 16               | Butt 16            | Butt 16      |
| Length of grading section <sup>b</sup> (feet)                                                            | Best 12               | Best 12            | Best 12      |
| D.b.h., minimum (inches)                                                                                 | 16 <sup>c</sup>       | 13                 | 11           |
| D.i.b., minimum at top of grading section (inches)                                                       | 13 <sup>c</sup> 16 20 | 11 <sup>d</sup> 12 | 8            |
| Clear cuttings (on the 3 best faces) <sup>e</sup>                                                        |                       |                    |              |
| Length, minimum (feet)                                                                                   | 7 5 3                 | 3 3                | 2            |
| Number on face (maximum)                                                                                 | 2                     | 2 3                | Unlimited    |
| Yield in face length (minimum)                                                                           | 5/6                   | 4/6                | 3/6          |
| Cull deduction (including crook and sweep, but excluding shake) maximum within grading section (percent) | 9                     | f                  | 50           |

<sup>a</sup> Hanks (1976)

<sup>b</sup> Whenever a 14- or 16-foot section of the butt 16-foot log is better than the best 12-foot section, the grade of the longer section will become the grade of the tree. This longer section, when used, is the basis for determining the grading factors such as diameter and cull deduction.

<sup>c</sup> In basswood and ash, d.i.b. at top of grading section must be 12 inches and d.b.h. must be 15 inches.

<sup>d</sup> Grade 2 trees can be 10 inches d.i.b. at top of grading section if they otherwise meet surface requirements for small grade 1's.

<sup>e</sup> A clear cutting is a portion of a face free of defects, extending the width of the face. A face is one-fourth of the surface of the grading section as divided lengthwise.

<sup>f</sup> Fifteen percent crook and sweep or 40 percent total cull deduction are permitted in grade 2 trees, if size and surface of grading section qualify as grade 1. If rot shortens the required clear cuttings to the extent of dropping the butt log to grade 2, do not drop the tree's grade to 3 unless the cull deduction for rot is greater than 40 percent.

## Forest Service Standard Specifications for Hardwood Construction Logs (tie and timber logs) <sup>a, b</sup>

|                             |                                                                                                                                                                            |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Position in tree            | Butts and uppers                                                                                                                                                           |
| Minimum diameter, small end | 8 inches                                                                                                                                                                   |
| Minimum length without trim | 8 feet                                                                                                                                                                     |
| Clear cuttings              | No requirements                                                                                                                                                            |
| Sweep allowance             | One-fourth of the diameter at the small end for each 8 feet of length.                                                                                                     |
| Sound surface defects:      |                                                                                                                                                                            |
| Single knots                | Any number, if no one knot has an average diameter above the callus in excess of one-third of the log diameter at point of occurrence.                                     |
| Whorled knots               | Any number, if the sum of knot diameters above the callus does not exceed one-third of the log diameter at point of occurrence.                                            |
| Holes                       | Any number, provided none has a diameter over one-third of the log diameter at point of occurrence and none extends more than 3 inches into included timber <sup>c</sup> . |
| Unsound surface defects:    | Same requirements as for sound defects if they extend into included timber.<br>No limit if they do not.                                                                    |

<sup>a</sup> Rast et al. (1973).

<sup>b</sup> These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, it may be necessary to subdivide the class into grades.

<sup>c</sup> Included timber is always square, and dimension is judged from small end.

## Eastern White Pine Saw Log Grade Specifications <sup>a</sup>

| Grading factor                         | Log grade 1                                                                                                                                          | Log grade 2                                                                                                                                                                                                                                                    | Log grade 3             | Log grade 4                                                                                                                                                    |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Minimum scaling diameter (inches)   | 14 <sup>b</sup>                                                                                                                                      | 6                                                                                                                                                                                                                                                              | 6                       | 6                                                                                                                                                              |
| 2. Minimum log length (feet)           | 10 <sup>c</sup>                                                                                                                                      | 8                                                                                                                                                                                                                                                              | 8                       | 8                                                                                                                                                              |
| 3. Maximum weevil injury (number)      | None                                                                                                                                                 | None                                                                                                                                                                                                                                                           | 2 injuries <sup>d</sup> | No limit                                                                                                                                                       |
| 4. Minimum face requirements           | Two full length or four 50% <sup>e</sup> length good faces (in addition, log knots on balance of faces shall not exceed size limit of grade 2 logs). | <b>NO GOOD FACES REQUIRED</b><br>Maximum diameter of log knots on three best faces:<br><b>SOUND RED KNOTS</b><br>not to exceed 1/6 scaling diameter and 3" maximum<br><b>OVERGROWN/DEAD/BLACK KNOTS</b><br>not to exceed 1/12 scaling diameter and 1 1/2" max. |                         | Includes all logs not qualifying for No. 3 or better and having at least 1/3 of their gross volume in sound wood suitable for manufacture into standard lumber |
| 5. Maximum sweep or crook (%)          | 20                                                                                                                                                   | 30                                                                                                                                                                                                                                                             | 40                      | 66 2/3                                                                                                                                                         |
| 6. Maximum total scaling deduction (%) | 50                                                                                                                                                   | 50                                                                                                                                                                                                                                                             | 50                      | 66 2/3                                                                                                                                                         |

After the tentative grade is established from face examination, the grade will be reduced whenever the following defects are evident:

7. Conks, punk knots, and pine borer damage on bark surface. <sup>f</sup>

Degrade one grade if present on one face.

Degrade two grades if present on two faces.

Degrade three grades if present on three or more faces.

8. Log end defects: red rot, ring shake, heavy stain, and pine borer damage outside the heart center of log. <sup>f</sup> Consider log as having a total of 8 quarters (4 on each end) and degrade as indicated.

Degrade one grade if present in 2 quarters of log ends.

Degrade two grades if present in 3 or 4 quarters of log ends.

Degrade three grades if present in 5 or more quarters of log ends.

a. Ostrander and Brisbin (1971)

b. 12- and 13-inch logs with four full-length good faces are acceptable.

c. 8-foot logs with four full-length good faces are acceptable.

d. 8-foot Number 3 logs limited to one weevil injury.

e. Minimum 50% length good face must be at least 6 feet.

f. Factors 7 and 8 are not cumulative (total degrade based on more serious of the two). No log is to be degraded below grade 4 if net scale is at least one-third of gross scale.

## Log Grades for Jack Pine and Red Pine <sup>a</sup>

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Grade 1: Trees with three or four clear faces on the 16-foot grading section.<sup>b</sup>

Grade 2: Trees with one or two clear faces on the 16-foot grading section.

Grade 3: Trees with no clear faces on the 16-foot grading section.

After the tentative grade is established from above, the tree will be reduced one grade for each of the following, except that no tree can be reduced below grade 3, provided the total scaling deductions for sweep and/or rot do not exceed two-thirds of the gross scale of the tree.

*Sweep.* Degrade any tentative grade 1 or 2 tree one grade if sweep in the lower 12 feet of grading sections amounts to 3 or more inches and equals or exceeds one-fourth of the diameter at breast height.

*Heart rot.* Degrade any tentative grade 1 or 2 tree one grade if conk, punk knots, massed hyphae, or other evidence of advanced heart rot is found anywhere on the main tree stem.

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<sup>a</sup> Campbell (1964)

<sup>b</sup> A face is one-fourth of the circumference in width extending full length of the grading section. Clear faces are those free of: knots measuring more than 1/2-inch in diameter, overgrown knots of any size, and holes more than 1/4-inch in diameter. Faces may be rotated to obtain the maximum number of clear on the grading section.

## Log Grades for All Other Softwood Logs

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Grade 1

1. Trees must be 16 inches in diameter or larger, grading section 12 feet in length or longer, and with deduction for defect not over 30 percent of gross scale.
2. Trees must be at least 75 percent clear on each of three faces.
3. All knots outside clear cutting must be sound and not more than 2-1/2 inches in size.

Grade 2

1. Trees must be 12 inches in diameter or larger, grading section 12 feet in length or longer, and with a net scale after deduction for defect of at least 50 percent of the gross scale deducted for defect.
2. Trees must be at least 50 percent clear on each of three faces or 75 percent clear on two faces.

Grade 3

1. Trees must be 6 inches in diameter or larger, grading section 12 feet in length or longer, and with a net scale after deduction for defect of at least 50 percent of the gross contents of the log.

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Note: Diameters are diameter inside bark (d.i.b.) at small end of grading section.  
Percent clear refers to percent clear in one continuous section.



Northern white-cedar ..... *Thuja occidentalis*  
 Other softwoods:  
 Eastern redcedar ..... *Juniperus virginiana*  
 Norway spruce ..... *Picea abies*  
 Engelmann spruce ..... *P. engelmannii*  
 Blue spruce ..... *P. pungens*  
 Austrian pine ..... *Pinus nigra*  
 Scotch pine ..... *P. sylvestris*  
 Ponderosa pine ..... *P. ponderosa*  
 Douglas-fir ..... *Pseudotsuga menziesii*

## DEFINITION OF TERMS

### Average annual mortality of growing stock.

—The average cubic foot volume of sound wood in growing-stock trees that died in 1 year. Average annual mortality is the average for the years between inventories (1983 to 1995 in this report).

### Average annual mortality of sawtimber.

—The average board foot volume of sound wood in sawtimber trees that died in 1 year. Average annual mortality is the average for the years between inventories (1983 to 1995 in this report).

### Average annual removals from growing stock.

—The average net growing-stock volume in growing-stock trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Average annual removals of growing stock are the average for the years between inventories (1983 to 1995 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

### Average annual removals from sawtimber.

—The average net board foot sawtimber volume of live sawtimber trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Average annual removals of sawtimber are the average for the years between inventories (1983 to 1995 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

### Average net annual growth of growing stock.

—The annual change in cubic foot volume of sound wood in live sawtimber and poletimber trees, and the total volume of

trees entering these classes through in-growth, less volume losses resulting from natural causes. Average net annual growing stock is the average for the years between inventories (1983 to 1995 in this report).

### Average net annual growth of sawtimber.

—The annual change in the board foot volume of live sawtimber trees, and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes. Average net annual growth of sawtimber is the average for the years between inventories (1983 to 1995 in this report).

**Basal area.**—Tree area in square feet of the cross section at breast height of a single tree. When the basal areas of all trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

**Biomass.**—The aboveground volume of all live trees (including bark but excluding foliage) reported in green tons (i.e., green weight).

Biomass has four components:

*Bole.*—Biomass of a tree from 1 foot above the ground to a 4-inch top outside bark.

*Tops and limbs.*—Total biomass of tree from a 1-foot stump minus the bole.

*1- to 5-inch trees.*—Total aboveground biomass of a tree from 1 to 5 inches in diameter at breast height.

*Stump.*—Biomass of a tree 5 inches d.b.h. and larger from the ground to a height of 1 foot.

**Commercial species.**—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, Osage-orange, and redbud.)

**Cord.**—One standard cord is 128 cubic feet of stacked wood, including bark and air space. Cubic feet can be converted to solid wood standard cords by dividing by 79.

**Corporate.**—Lands owned by a private corporation not in the business of operating primary wood-using plants.

**County and municipal land.**—Land owned by counties and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

**Cropland.**—Land under cultivation within the last 24 months; including cropland harvested, crop failures, cultivated summer fallow, idle cropland used only for pasture, orchards, active Christmas tree plantations indicated by annual shearing, nurseries, and land in soil improvement crops, but excluding land cultivated in developing improved pasture.

**Cull.**—Portions of a tree that are unusable for industrial wood products because of rot, missing or dead material, form, or other defect.

**Current annual growth of growing stock.**—The annual change in volume of sound wood in live sawtimber and poletimber trees, and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes, reported for a single year (1995 in this report). Current growth is based on an estimate of the current annual increment of each growing-stock tree in the inventory.

**Current annual growth of sawtimber.**—The annual change in the volume of live sawtimber trees, and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes, reported for a single year (1995 in this report). Current growth is based on an estimate of the current annual increment of each growing-stock tree in the inventory.

**Current annual removals from growing stock.**—The current net growing-stock volume in growing-stock trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Current annual removals of growing stock are reported for a single year (1995 in this report); they are based on a survey of primary wood processing mills to determine removals for products and on information from remeasurement plots (see Survey Procedures in Appendix) to determine removals due to land-use change.

**Current annual removals from sawtimber.**—The current net board foot sawtimber volume of live sawtimber trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the

volume of other removals. Current annual removals of sawtimber are reported for a single year (1995 in this report); they are based on a survey of primary wood processing mills to determine removals for products and on information from remeasurement plots (see Survey Procedures in Appendix) to determine removals due to land-use change.

**Diameter class.**—A classification of trees based on diameter outside bark, measured at breast height 4.5 feet above the ground. (Note d.b.h. is the common abbreviation for diameter at breast height.) Two-inch diameter classes are commonly used in Forest Inventory and Analysis, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.

**Diameter at breast height (d.b.h.).**—The outside bark diameter at 4.5 feet (1.37 m) above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

**Farm.**—Any place from which \$1,000 or more of agricultural products were produced and sold during the year.

**Farmer-owned land.**—(See Individual private land.)

**Forest industry land.**—Land owned by companies or individuals operating primary wood-using plants.

**Forest land.**—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide. (See Tree, Land, Timberland, Reserved forest land, Other forest land, Stocking, and Water.)

**Forest type.**—A classification of forest land based on the species forming a plurality of live tree stocking. The associated species for each forest type are based on net volume of growing stock and all live biomass by species group. Major forest types in the State are:

*Jack pine.*—Forests in which jack pine comprises a plurality of the stocking. Species commonly associated with the jack pine forest type in Wisconsin include red pine, select red oaks, aspen, and eastern white pine.

*Red pine.*—Forests in which red pine comprises a plurality of the stocking. Species commonly associated with the red pine forest type in Wisconsin include eastern white pine, jack pine, and aspen.

*Eastern white pine.*—Forests in which eastern white pine comprises a plurality of the stocking. Species commonly associated with the eastern white pine forest type in Wisconsin include red pine, aspen, red maple, paper birch, red oak, white spruce, and balsam fir.

*Balsam fir.*—Forests in which balsam fir and white spruce comprise a plurality of stocking, with balsam fir the most common. Species commonly associated with the balsam fir forest type in Wisconsin include white spruce, aspen, northern white-cedar, paper birch, red maple, black spruce, and eastern white pine.

*White spruce.*—Forests in which white spruce and balsam fir comprise a plurality of the stocking, with white spruce the most common. Species commonly associated with the white spruce forest type in Wisconsin include aspen, paper birch, balsam fir, eastern white pine, red maple, and northern white-cedar.

*Black spruce.*—Forests in which swamp conifers comprise a plurality of the stocking, with black spruce the most common. Species commonly associated with the black spruce forest type in Wisconsin include tamarack, balsam fir, eastern white pine, northern white-cedar, aspen, jack pine, and paper birch.

*Northern white-cedar.*—Forests in which swamp conifers comprise a plurality of the stocking, with northern white-cedar the most common. Species commonly associated with the northern white-cedar forest type in Wisconsin include balsam fir, paper birch, black spruce, red maple, and aspen.

*Tamarack.*—Forests in which swamp conifers comprise a plurality of the stocking, with tamarack the most common. Species commonly associated with the tamarack forest type in Wisconsin include northern white-cedar, black spruce, balsam fir, and paper birch.

*Oak-hickory.*—Forests in which northern red oak, white oak, bur oak, or hickories, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the oak-hickory forest type in Wisconsin include red maple, aspen, and black cherry.

*Elm-ash-soft maple.*—Forests in which lowland elm, ash, red maple, silver maple, and cottonwood, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the elm-ash-soft maple forest type in Wisconsin include northern white-cedar, aspen, cottonwood, and balsam fir.

*Maple-beech-birch.*—Forests in which sugar maple, yellow birch, American elm, and red maple, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the maple-beech-birch forest type in Wisconsin include basswood, eastern hemlock, green and white ash, aspen, black cherry, and select red oaks.

*Aspen.*—Forests in which quaking aspen or bigtooth aspen, singly or in combination, comprise a plurality of the stocking. Species commonly associated with the aspen forest type in Wisconsin include red maple, paper birch, balsam fir, and select red oaks.

*Paper birch.*—Forests in which paper birch comprises a plurality of the stocking. Species commonly associated with the paper birch forest type in Wisconsin include aspen, red maple, balsam fir, northern white-cedar, sugar maple, and balsam poplar.

*Balsam poplar.*—Forests in which balsam poplar comprises a plurality of the stocking. Species commonly associated with the balsam poplar forest type in Wisconsin include balsam fir, aspen, northern white-cedar, paper birch, black ash, and white spruce.

**Growing-stock tree.**—A live tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

**Growing-stock volume.**—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over, from 1 foot above the ground to a minimum 4.0-inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

**Hard hardwoods.**—Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and ash.

**Hardwoods.**—Dicotyledonous trees, usually broad-leaved and deciduous. (See Soft hardwoods and Hard hardwoods.)

**Improved pasture.**—Land currently improved for grazing by cultivating, seeding, irrigating, or clearing trees or brush and less than 16.7 percent stocked with trees.

**Indian land.**—Land held in trust by the United States for tribes or individual Indians.

**Individual private land.**—Privately owned land not owned by forest industry. This class includes the formerly used Farmer and Miscellaneous private classes.

**Industrial wood.**—All roundwood products except residential fuelwood.

**Land.**—(a) *Bureau of the Census.* Dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

(b) *Forest Inventory and Analysis.* The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

**Live trees.**—Growing-stock, rough, and rotten trees 1.0 inch d.b.h. and larger.

**Log grade.**—A log classification based on external characteristics as indicators of quality or value. Log grade was assigned to a sample of conifer sawtimber trees throughout the State during the 1996 inventory. Also see Tree grade. (See Appendix for specific grading factors used.)

**Logging residue.**—The unused portions of cut trees, plus unused trees killed by logging.

**Marsh.**—Nonforest land that characteristically supports low, generally herbaceous or shrubby vegetation, and that is intermittently covered with water.

**Merchantable.**—Refers to a pulpwood or saw-log section that meets pulpwood or saw-log specifications, respectively.

**Miscellaneous Federal land.**—Federal land other than National Forest and land administered by the Bureau of Land Management or Bureau of Indian Affairs.

**Miscellaneous private land.**—(See Individual private land.)

**National Forest land.**—Federal land that has been legally designated as National Forest or purchase units, and other land administered by the USDA Forest Service.

**Net volume.**—Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

**Noncommercial species.**—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

**Nonforest land.**—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land.) If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area to qualify as nonforest land.

*Nonforest land without trees.*—Nonforest land with no live trees present.

*Nonforest land with trees.*—Nonforest land with one or more trees per acre at least 5 inches d.b.h.

**Nonstocked land.**—Timberland less than 16.7 percent stocked with all live trees.

**Other forest land.**—Forest land not capable of producing 20 cubic feet per acre per year of industrial wood crops under natural conditions and not associated with urban or rural development. Many of these sites contain tree species that are not currently used for industrial wood production or trees of poor form, small size, or inferior quality that are unfit for most industrial products. Unproductivity may be the result of adverse site conditions such as sterile soil, dry climate, poor drainage, high elevation, and rockiness. This land is not withdrawn from timber utilization.

**Other removals.**—Growing-stock trees removed but not used for products, or trees left standing but “removed” from the timberland classification by land-use change. Examples are removals from cultural operations such as timber stand improvement work and land clearing, and the standing volume on land classified originally as timberland but later designated as reserved from timber harvesting (such as a newly established State park).

**Ownership size class.**—The amount of timberland owned by one owner, regardless of the number of parcels.

**Pasture.**—Land presently used for grazing or under cultivation to develop grazing.

**Plant byproducts.**—Plant residues used for products such as mulch, pulp chips, and fuelwood.

**Plantation.**—An artificially reforested area sufficiently productive to qualify as timberland. The planted species is not necessarily predominant. Christmas tree plantations, which are considered cropland, are not included.

**Plant residues.**—Wood and bark materials generated at manufacturing plants during production of other products.

**Poletimber stand.**—(See Stand-size class.)

**Poletimber tree.**—A live tree of commercial species at least 5.0 inches d.b.h., but smaller than sawtimber size.

**Potential productivity class.**—A classification of forest land in terms of inherent capacity to grow crops of industrial wood. The class identifies the potential growth in merchantable cubic feet/acre/year at culmination of mean annual increment of fully stocked natural stands.

**Reserved forest land.**—Forest land withdrawn from timber use through statute, administrative regulation, designation. Note: Historically, Christmas tree plantations were classified as reserved forest land. However, Christmas tree plantations are now classified as cropland.

**Rotten tree.**—Live trees of commercial species that do not contain at least one 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

**Rough tree.**—(a) Live trees of commercial species that do not contain at least one merchantable 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

**Roundwood products.**—Logs, bolts, or other round sections (including chips from roundwood) cut from trees for industrial or consumer uses. (Note: Includes saw logs, veneer logs, and bolts; cooperage logs and bolts; pulpwood; fuelwood; pilings; poles; posts; hewn ties; mine timbers; and various other round, split, or hewn products.)

**Salvable dead tree.**—A standing or down dead tree considered merchantable by regional standards.

**Sapling.**—A live tree 1.0 to 5.0 inches d.b.h.

**Sapling-seedling stand.**—(See Stand-size class.)

**Saw log.**—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight

and with a minimum diameter outside bark (d.o.b.) for softwoods of 7.0 inches (9.0 inches for hardwoods) or other combinations of size and defect specified by regional standards.

**Saw-log portion.**—That part of the bole of sawtimber trees between the stump and the saw-log top.

**Saw-log top.**—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

**Sawtimber stand.**—(See Stand-size class.)

**Sawtimber tree.**—A live tree of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. Hardwoods must be at least 11.0 inches d.b.h.

**Sawtimber volume.**—Net volume of the saw-log portion of live sawtimber in board feet, International 1/4-inch rule (unless specified otherwise), from stump to a minimum 7.0 inches top d.o.b. for softwoods and a minimum 9.0 inches top d.o.b. for hardwoods.

**Seedling.**—A live tree less than 1.0 inch d.b.h. that is expected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

**Short-log (rough tree).**—A sawtimber-size tree of commercial species that contains at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

**Shrub.**—A woody, perennial plant differing from a perennial herb in its persistent and woody stem(s) and less definitely from a tree in its lower stature and/or the general absence of a well-defined main stem. For this report, shrubs were separated somewhat arbitrarily into tall and low shrubs as follows:

*Tall shrubs.*—Normally taller than 1.6 to 3.2 feet.

*Low shrubs.*—Normally shorter than 1.6 to 3.2 feet. (Woody perennial vines, such as grape, were included with low shrubs.)

**Shrub and tree seedling biomass.**—The total aboveground weight of trees less than 1.0 inch in diameter and all shrubs.

**Site index.**—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

**Soft hardwoods.**—Hardwood species with an average specific gravity less than 0.50, such as cottonwood, red maple, basswood, and willow.

**Softwoods.**—Coniferous trees, usually evergreen, having needles or scale-like leaves.

**Stand.**—A group of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

**Stand-age class.**—A classification based on age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

**Stand-size class.**—A classification of stocked (see Stocking) forest land based on the size class of live trees on the area; that is, sawtimber, poletimber, or seedlings and saplings.

*Sawtimber stands.*—Stands with half or more of live tree stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

*Poletimber stands.*—Stands with half or more of live tree stocking in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

*Sapling-seedling stands.*—Stands with more than half of the live tree stocking in saplings and/or seedlings.

**State land.**—Land owned by the State of Wisconsin or leased to it for 50 years or more.

**Stocking.**—The degree of occupancy of land by live trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully use the growth potential of the land; that is, the stocking standard. A stocking percent of 100 indicates full use of the site and is equivalent to 80 square feet of basal area per acre in trees 5.0 inches d.b.h. and larger. In

a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5 inches d.b.h.

Stands are grouped into the following stocking classes:

*Overstocked stands.*—Stands in which stocking of live trees is 133.0 percent or more.

*Fully stocked stands.*—Stands in which stocking of live trees is from 100.0 to 132.9 percent.

*Medium stocked stands.*—Stands in which stocking of live trees is from 60.0 to 99.9 percent.

*Poorly stocked stands.*—Stands in which stocking of live trees is from 16.7 to 59.9 percent.

*Nonstocked areas.*—Timberland on which stocking of live trees is less than 16.7 percent.

**Timber products output.**—All timber products cut from roundwood and byproducts of wood manufacturing plants. Roundwood products include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edging, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulpwood chips or other products.

**Timberland.**—Forest land that is producing, or is capable of producing, more than 20 cubic feet per acre per year of industrial wood crops under natural conditions, that is not withdrawn from timber use, and that is not associated with urban or rural development. Currently inaccessible and inoperable areas are included. (Timberland was formerly called commercial forest land.)

**Tree.**—A woody plant usually having one or more perennial stems, a more or less definitely formed crown of foliage, and a height of at least 12 feet at maturity.

**Tree biomass.**—The total aboveground weight (including the bark but excluding the foliage) of all trees from 1 to 5 inches in d.b.h., and

the total aboveground weight (including the bark but excluding the foliage) from a 1-foot stump for trees more than 5 inches in diameter.

**Tree grade.**—A classification of the lower 16 feet of the bole of standing trees based on external characteristics as indicators of the quality and quantity of lumber that could be produced from the tree. Tree grade was assigned to a sample of hardwood sawtimber trees during the 1996 inventory. Also see Log grade. (See Appendix for specific grading factors used.)

**Tree size class.**—A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings, and seedlings.

**Upper stem portion.**—That part of the bole of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches d.o.b. or to the point where the central stem breaks into limbs.

**Urban and other areas.**—Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land-use class.

**Urban forest land.**—Land that would otherwise meet the criteria for timberland, but is in an urban-suburban area surrounded by commercial, industrial, or residential development and not likely to be managed for the production of industrial wood products on a continuing basis. Wood removed would be for land clearing, fuelwood, or esthetic purposes. Such forest land may be associated with industrial, commercial, residential subdivision, industrial parks, golf course perimeters, airport buffer strips, and public urban parks that qualify as forest land.

**Water.**—(a) *Bureau of the Census.*—Permanent inland water surfaces, such as lakes, reservoirs, and ponds at least 40 acres in area; and streams, sloughs, estuaries, and canals at least one-eighth of a statute mile wide.

(b) *Noncensus.*—Permanent inland water surfaces, such as lakes, reservoirs, and

ponds from 1 to 39.9 acres in area; and streams, sloughs, estuaries, and canals from 120 feet to one-eighth of a statute mile wide.

**Wooded pasture.**—Improved pasture with more than 16.7 percent stocking in live trees, but less than 25 percent stocking in growing-stock trees. Area is currently improved for grazing or there is other evidence of grazing.

**Wooded strip.**—An acre or more of natural continuous forest land that would otherwise meet survey standards for timberland except that it is less than 120 feet wide.

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Table 1. --- Area of land and major land-use class, Chequamegon-Nicolet National Forest, 1996

(In thousand acres)

| Land base   | Total<br>land<br>area | Forest land     |            |                         |                      | Other<br>land |
|-------------|-----------------------|-----------------|------------|-------------------------|----------------------|---------------|
|             |                       | Total<br>forest | Timberland | Reserved<br>forest land | Other<br>forest land |               |
| Chequamegon | 852.0                 | 785.9           | 766.0      | 7.2                     | 12.7                 | 66.1          |
| Nicolet     | 667.4                 | 637.4           | 599.4      | 36.8                    | 1.2                  | 30.0          |
| Total       | 1,519.4               | 1,423.3         | 1,365.4    | 44.0                    | 13.9                 | 96.1          |

Table 2. -- Area of timberland by forest type group/local type and stand-size class,  
Chequamegon, 1983 and 1996

(In thousand acres)

| Forest type group/<br>local type | All stands |       | Sawtimber |       | Poletimber |       | Sapling/seedling |       | Nonstocked |      |
|----------------------------------|------------|-------|-----------|-------|------------|-------|------------------|-------|------------|------|
|                                  | 1983       | 1996  | 1983      | 1996  | 1983       | 1996  | 1983             | 1996  | 1983       | 1996 |
| Jack pine                        | 39.4       | 19.0  | 3.0       | 6.9   | 36.4       | 3.2   | --               | 8.9   | --         | --   |
| Red pine                         | 57.0       | 48.0  | 28.2      | 21.9  | 7.8        | 12.2  | 21.0             | 13.9  | --         | --   |
| White pine                       | 7.3        | 9.4   | 7.3       | 8.2   | --         | 1.2   | --               | --    | --         | --   |
| Balsam fir                       | 34.3       | 21.4  | 13.0      | 7.4   | 19.3       | 4.9   | 2.0              | 9.1   | --         | --   |
| White spruce                     | 18.7       | 12.0  | 10.0      | 3.3   | 8.7        | 5.5   | --               | 3.2   | --         | --   |
| Black spruce                     | 18.8       | 30.5  | --        | --    | --         | 6.3   | 18.8             | 24.2  | --         | --   |
| Northern white-cedar             | 33.6       | 24.4  | 11.2      | 16.2  | 21.7       | 8.2   | 0.7              | --    | --         | --   |
| Tamarack                         | 12.9       | 17.3  | --        | 2.0   | 11.5       | 2.2   | 1.4              | 13.1  | --         | --   |
| Oak-hickory                      | 34.5       | 17.9  | --        | 1.6   | 32.2       | 12.8  | 2.3              | 3.5   | --         | --   |
| Elm-ash-soft maple               | 23.1       | 59.2  | 4.5       | 7.2   | 15.2       | 30.3  | 3.4              | 21.7  | --         | --   |
| Maple-basswood                   | 206.1      | 284.6 | 55.6      | 124.9 | 141.9      | 135.7 | 8.6              | 24.0  | --         | --   |
| Aspen                            | 180.8      | 190.7 | 3.4       | 26.0  | 85.3       | 58.2  | 92.1             | 106.5 | --         | --   |
| Paper birch                      | 27.0       | 29.4  | --        | 3.2   | 21.7       | 20.3  | 5.3              | 5.9   | --         | --   |
| Nonstocked                       | --         | 2.2   | --        | --    | --         | --    | --               | --    | --         | 2.2  |
| All types                        | 693.5      | 766.0 | 136.2     | 228.8 | 401.7      | 301.0 | 155.6            | 234.0 | --         | 2.2  |

Table 2a. -- Area of timberland by forest type group/local type and stand-size class,  
Nicolet, 1983 and 1996

(In thousand acres)

| Forest type group/<br>local type | All stands |       |  | Sawtimber |       | Poletimber |       | Sapling/seedling |       | Nonstocked |      |
|----------------------------------|------------|-------|--|-----------|-------|------------|-------|------------------|-------|------------|------|
|                                  | 1983       | 1996  |  | 1983      | 1996  | 1983       | 1996  | 1983             | 1996  | 1983       | 1996 |
| Jack pine                        | 10.9       | 7.5   |  | 2.2       | 0.3   | 8.2        | 3.9   | 0.5              | 3.3   | --         | --   |
| Red pine                         | 46.4       | 38.7  |  | 41.4      | 30.1  | 2.5        | 1.9   | 2.5              | 6.7   | --         | --   |
| White pine                       | 2.3        | 4.4   |  | 2.3       | 4.4   | --         | --    | --               | --    | --         | --   |
| Balsam fir                       | 34.3       | 25.6  |  | 6.9       | 2.2   | 22.7       | 4.4   | 4.7              | 19.0  | --         | --   |
| White spruce                     | 12.5       | 15.4  |  | 2.7       | 2.6   | 6.6        | 5.8   | 3.2              | 7.0   | --         | --   |
| Black spruce                     | 17.7       | 28.8  |  | --        | --    | 15.7       | 11.8  | 2.0              | 17.0  | --         | --   |
| Northern white-cedar             | 35.0       | 29.2  |  | 4.2       | 4.6   | 27.8       | 17.7  | 3.0              | 6.9   | --         | --   |
| Tamarack                         | 4.0        | 6.3   |  | 2.0       | --    | 2.0        | 1.0   | --               | 5.3   | --         | --   |
| Oak-hickory                      | 10.7       | 9.8   |  | --        | 1.8   | 10.7       | 8.0   | --               | --    | --         | --   |
| Elm-ash-soft maple               | 2.9        | 24.3  |  | 0.3       | 2.1   | 2.6        | 12.5  | --               | 9.7   | --         | --   |
| Maple-basswood                   | 228.8      | 258.8 |  | 69.5      | 101.2 | 154.5      | 144.1 | 4.8              | 13.5  | --         | --   |
| Aspen                            | 131.6      | 127.9 |  | 20.1      | 21.9  | 57.0       | 43.0  | 54.5             | 63.0  | --         | --   |
| Paper birch                      | 11.7       | 20.2  |  | 0.3       | 2.1   | 11.4       | 14.4  | --               | 3.7   | --         | --   |
| Balsam poplar                    | --         | 0.2   |  | --        | --    | --         | --    | --               | 0.2   | --         | --   |
| Nonstocked                       | --         | 2.3   |  | --        | --    | --         | --    | --               | --    | --         | 2.3  |
| All types                        | 548.8      | 599.4 |  | 151.9     | 173.3 | 321.7      | 268.5 | 75.2             | 155.3 | --         | 2.3  |

Table 3. -- Area of timberland by forest type and potential productivity class,  
Chequamegon, 1996

(In thousand acres)

| Forest type and<br>stand-size class | All<br>classes | Potential productivity class (cubic feet of growth per acre per year) |         |        |       |       |  |
|-------------------------------------|----------------|-----------------------------------------------------------------------|---------|--------|-------|-------|--|
|                                     |                | 165+                                                                  | 120-164 | 85-119 | 50-84 | 20-49 |  |
| Jack pine                           | 19.0           | --                                                                    | --      | --     | 15.0  | 4.0   |  |
| Red pine                            | 48.0           | --                                                                    | 12.5    | 26.7   | 6.8   | 2.0   |  |
| White pine                          | 9.4            | --                                                                    | --      | 7.6    | 1.5   | 0.3   |  |
| Balsam fir                          | 21.4           | --                                                                    | 3.5     | 9.3    | 6.7   | 1.9   |  |
| White spruce                        | 12.0           | --                                                                    | --      | 6.8    | 2.0   | 3.2   |  |
| Black spruce                        | 30.5           | --                                                                    | --      | 4.5    | 9.0   | 17.0  |  |
| Northern white-cedar                | 24.4           | --                                                                    | --      | --     | 3.5   | 20.9  |  |
| Tamarack                            | 17.3           | --                                                                    | --      | --     | 3.5   | 13.8  |  |
| Oak-hickory                         | 17.9           | --                                                                    | --      | 2.4    | 14.0  | 1.5   |  |
| Elm-ash-soft maple                  | 59.2           | --                                                                    | --      | 0.1    | 8.5   | 50.6  |  |
| Maple-basswood                      | 284.6          | --                                                                    | 3.6     | 58.7   | 154.3 | 68.0  |  |
| Aspen                               | 190.7          | 3.8                                                                   | 3.4     | 93.2   | 86.3  | 4.0   |  |
| Paper birch                         | 29.4           | --                                                                    | --      | 3.2    | 20.1  | 6.1   |  |
| Nonstocked                          | 2.2            | --                                                                    | --      | --     | --    | 2.2   |  |
| All types                           | 766.0          | 3.8                                                                   | 23.0    | 212.5  | 331.2 | 195.5 |  |

Table 3a. -- Area of timberland by forest type and potential productivity class,  
Nicolet, 1996

(In thousand acres)

| Forest type and<br>stand-size class | All<br>classes | Potential productivity class (cubic feet of growth per acre per year) |         |        |       |       |
|-------------------------------------|----------------|-----------------------------------------------------------------------|---------|--------|-------|-------|
|                                     |                | 165+                                                                  | 120-164 | 85-119 | 50-84 | 20-49 |
| Jack pine                           | 7.5            | --                                                                    | 2.0     | 1.7    | 3.8   | --    |
| Red pine                            | 38.7           | 3.0                                                                   | 21.1    | 8.8    | 5.8   | --    |
| White pine                          | 4.4            | --                                                                    | 1.7     | 1.6    | 1.1   | --    |
| Balsam fir                          | 25.6           | --                                                                    | 5.8     | 8.2    | 4.1   | 7.5   |
| White spruce                        | 15.4           | --                                                                    | --      | 7.4    | 8.0   | --    |
| Black spruce                        | 28.8           | --                                                                    | --      | --     | 4.1   | 24.7  |
| Northern white-cedar                | 29.2           | --                                                                    | --      | --     | 2.4   | 26.8  |
| Tamarack                            | 6.3            | --                                                                    | --      | 1.4    | 1.6   | 3.3   |
| Oak-hickory                         | 9.8            | --                                                                    | --      | 1.8    | 8.0   | --    |
| Elm-ash-soft maple                  | 24.3           | --                                                                    | --      | --     | 4.1   | 20.2  |
| Maple-basswood                      | 258.8          | --                                                                    | --      | 74.2   | 151.7 | 32.9  |
| Aspen                               | 127.9          | 2.0                                                                   | 3.6     | 95.4   | 21.2  | 5.7   |
| Paper birch                         | 20.2           | --                                                                    | --      | 4.2    | 14.3  | 1.7   |
| Balsam poplar                       | 0.2            | --                                                                    | --      | 0.2    | --    | --    |
| Nonstocked                          | 2.3            | --                                                                    | --      | --     | 2.3   | --    |
| All types                           | 599.4          | 5.0                                                                   | 34.2    | 204.9  | 232.5 | 122.8 |

Table 4. -- Area of timberland and stocking class of growing-stock trees <sup>1</sup>, Chequamegon-Nicolet National Forest, 1996

(In thousand acres)

| National Forest | All<br>classes | Stocking class of growing-stock trees |                   |                       |                  |
|-----------------|----------------|---------------------------------------|-------------------|-----------------------|------------------|
|                 |                | Non-<br>stocked <sup>2</sup>          | Poorly<br>stocked | Moderately<br>stocked | Fully<br>stocked |
| Chequamegon     | 766.0          | 3.0                                   | 62.5              | 179.6                 | 440.8            |
| Nicolet         | 599.4          | 2.3                                   | 29.0              | 110.0                 | 400.0            |
| Total           | 1,365.4        | 5.3                                   | 91.5              | 289.6                 | 840.8            |
|                 |                |                                       |                   |                       | 138.2            |

<sup>1</sup> This table is based on the stocking percent of growing-stock trees, rather than that of "live" trees. For this table, to use the definition of stocking found in the appendix, replace the term "live trees" with "growing-stock trees."

<sup>2</sup> Area of nonstocked in this table may differ from that of other tables in this report because this table includes land stocked with only growing-stock trees, rather than with all live trees.

Table 5. -- Number of all live trees on timberland by species group and diameter class, Chequamegon, 1983 and 1996

| 1983 Chequamegon     |             | (In thousand trees)                      |         |         |         |          |           |           |           |           |           |     |    |    |    |           |       |
|----------------------|-------------|------------------------------------------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----|----|----|----|-----------|-------|
| Species group        | All classes | Diameter class (inches at breast height) |         |         |         |          |           |           |           |           |           |     |    |    |    | 21.0-28.9 | 29.0+ |
|                      |             | 1.0-2.9                                  | 3.0-4.9 | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 |     |    |    |    |           |       |
| Softwoods            |             |                                          |         |         |         |          |           |           |           |           |           |     |    |    |    |           |       |
| Jack pine            | 13,366      | --                                       | 3,239   | 3,794   | 4,309   | 1,496    | 426       | 102       | --        | --        | --        | --  | -- | -- | -- | --        | --    |
| Red pine             | 7,288       | 330                                      | --      | 1,392   | 2,661   | 2,076    | 725       | 50        | 30        | 9         | 10        | 5   | -- | -- | -- | --        | --    |
| White pine           | 2,626       | 200                                      | 200     | 193     | 634     | 557      | 344       | 206       | 145       | 88        | 23        | 36  | -- | -- | -- | --        | --    |
| White spruce         | 16,426      | 4,680                                    | 2,560   | 3,190   | 3,880   | 1,441    | 520       | 133       | 17        | 5         | --        | --  | -- | -- | -- | --        | --    |
| Black spruce         | 11,216      | 6,530                                    | 2,780   | 1,359   | 430     | 114      | --        | --        | --        | 3         | --        | --  | -- | -- | -- | --        | --    |
| Balsam fir           | 36,661      | 22,640                                   | 6,770   | 4,420   | 1,791   | 853      | 83        | 72        | 32        | --        | --        | --  | -- | -- | -- | --        | --    |
| Hemlock              | 2,182       | --                                       | --      | 704     | 455     | 319      | 236       | 227       | 92        | 108       | 19        | 22  | -- | -- | -- | --        | --    |
| Tamarack             | 7,498       | 3,280                                    | 2,330   | 783     | 1,025   | 65       | 15        | --        | --        | --        | --        | --  | -- | -- | -- | --        | --    |
| Northern white-cedar | 7,679       | --                                       | 570     | 2,636   | 2,236   | 1,183    | 851       | 83        | 80        | 31        | 9         | --  | -- | -- | -- | --        | --    |
| Total softwoods      | 104,942     | 37,660                                   | 18,449  | 18,471  | 17,421  | 8,104    | 3,200     | 873       | 396       | 244       | 61        | 63  | -- | -- | -- | --        | --    |
| Hardwoods            |             |                                          |         |         |         |          |           |           |           |           |           |     |    |    |    |           |       |
| Select white oak     | 1,466       | 620                                      | --      | 355     | 428     | 63       | --        | --        | --        | --        | --        | --  | -- | -- | -- | --        | --    |
| Select red oak       | 19,240      | 1,960                                    | 4,940   | 5,372   | 3,819   | 2,067    | 671       | 241       | 75        | 42        | 32        | 21  | -- | -- | -- | --        | --    |
| Other red oak        | 1,081       | 390                                      | 380     | 304     | --      | 7        | --        | --        | --        | --        | --        | --  | -- | -- | -- | --        | --    |
| Other hickory        | 122         | --                                       | --      | --      | 72      | 19       | 31        | --        | --        | --        | --        | --  | -- | -- | -- | --        | --    |
| Basswood             | 7,369       | 2,490                                    | 480     | 1,445   | 861     | 953      | 802       | 235       | 79        | 4         | 17        | 3   | -- | -- | -- | --        | --    |
| Yellow birch         | 13,435      | 5,020                                    | 3,300   | 2,393   | 1,013   | 982      | 422       | 140       | 71        | 49        | 13        | 29  | 3  | -- | -- | --        | 3     |
| Hard maple           | 73,542      | 39,280                                   | 15,530  | 9,903   | 5,198   | 2,198    | 852       | 366       | 106       | 62        | 22        | 25  | -- | -- | -- | --        | --    |
| Soft maple           | 95,840      | 58,905                                   | 21,840  | 8,334   | 3,966   | 1,466    | 690       | 387       | 150       | 37        | 55        | 10  | -- | -- | -- | --        | --    |
| Elm                  | 1,866       | 730                                      | 360     | 314     | 223     | 70       | 97        | 42        | 19        | 5         | 6         | --  | -- | -- | -- | --        | --    |
| Black ash            | 15,422      | 8,240                                    | 3,600   | 2,048   | 708     | 596      | 186       | 33        | 11        | --        | --        | --  | -- | -- | -- | --        | --    |
| White & green ash    | 1,976       | 790                                      | --      | 138     | 297     | 406      | 141       | 129       | 62        | --        | 13        | --  | -- | -- | -- | --        | --    |
| Bigtooth aspen       | 24,858      | 15,900                                   | 2,270   | 1,633   | 2,250   | 1,723    | 784       | 217       | 42        | 32        | 7         | --  | -- | -- | -- | --        | --    |
| Quaking aspen        | 71,242      | 53,947                                   | 4,859   | 5,509   | 3,745   | 1,802    | 1,018     | 252       | 78        | 32        | --        | --  | -- | -- | -- | --        | --    |
| Paper birch          | 22,592      | 7,350                                    | 5,320   | 4,028   | 3,764   | 1,601    | 401       | 121       | 7         | --        | --        | --  | -- | -- | -- | --        | --    |
| Black cherry         | 3,546       | 3,510                                    | --      | 36      | --      | --       | --        | --        | --        | --        | --        | --  | -- | -- | -- | --        | --    |
| Other hardwoods      | 303         | 270                                      | --      | --      | --      | 33       | --        | --        | --        | --        | --        | --  | -- | -- | -- | --        | --    |
| Total hardwoods      | 353,900     | 199,402                                  | 62,879  | 41,812  | 26,344  | 13,986   | 6,095     | 2,163     | 700       | 263       | 165       | 88  | 3  | -- | -- | --        | --    |
| Noncommercial spp.   | 6,281       | 5,580                                    | 490     | 128     | 60      | --       | 23        | --        | --        | --        | --        | --  | -- | -- | -- | --        | --    |
| All species          | 465,123     | 242,642                                  | 81,818  | 60,411  | 43,825  | 22,090   | 9,318     | 3,036     | 1,096     | 507       | 226       | 151 | 3  | -- | -- | --        | --    |

(Table 5 continued)

(In thousand trees)

| 1996 Chequamegon     |             |                                          |         |         |         |          |           |           |           |           |           |           |       |    |
|----------------------|-------------|------------------------------------------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|----|
| Species group        | All classes | Diameter class (inches at breast height) |         |         |         |          |           |           |           |           |           |           |       |    |
|                      |             | 1.0-2.9                                  | 3.0-4.9 | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0+ |    |
| Softwoods            |             |                                          |         |         |         |          |           |           |           |           |           |           |       |    |
| Jack pine            | 7,150       | 3,216                                    | 1,257   | 645     | 955     | 644      | 297       | 121       | 9         | --        | 6         | --        | --    | -- |
| Red pine             | 12,504      | 3,339                                    | 2,232   | 1,868   | 1,765   | 1,256    | 1,215     | 460       | 201       | 113       | 38        | 17        | --    | -- |
| White pine           | 3,525       | 1,188                                    | 672     | 414     | 216     | 148      | 181       | 205       | 172       | 132       | 112       | 73        | 12    | -- |
| White spruce         | 11,487      | 4,287                                    | 3,135   | 1,701   | 1,061   | 591      | 401       | 184       | 53        | 48        | 12        | 14        | --    | -- |
| Black spruce         | 23,372      | 13,761                                   | 6,321   | 2,324   | 695     | 183      | 44        | 7         | 21        | 5         | 11        | --        | --    | -- |
| Balsam fir           | 62,220      | 43,750                                   | 11,820  | 3,629   | 1,757   | 887      | 273       | 83        | 17        | --        | 4         | --        | --    | -- |
| Hemlock              | 3,932       | 1,026                                    | 114     | 580     | 429     | 385      | 432       | 319       | 262       | 147       | 122       | 112       | 4     | -- |
| Tamarack             | 9,785       | 4,236                                    | 2,637   | 1,131   | 1,146   | 377      | 203       | 21        | 17        | 13        | 4         | --        | --    | -- |
| Northern white-cedar | 13,149      | 624                                      | 1,932   | 2,496   | 3,009   | 2,558    | 1,622     | 656       | 131       | 66        | 31        | 17        | 7     | -- |
| Other softwoods      | 48          | 48                                       | --      | --      | --      | --       | --        | --        | --        | --        | --        | --        | --    | -- |
| Total softwoods      | 147,172     | 75,475                                   | 30,120  | 14,788  | 11,033  | 7,029    | 4,668     | 2,056     | 883       | 524       | 340       | 233       | 23    | 23 |
| Hardwoods            |             |                                          |         |         |         |          |           |           |           |           |           |           |       |    |
| Select white oak     | 325         | 120                                      | --      | 69      | 95      | 31       | 10        | --        | --        | --        | --        | --        | --    | -- |
| Select red oak       | 10,414      | 4,425                                    | 708     | 983     | 1,528   | 1,153    | 721       | 486       | 197       | 115       | 34        | 64        | --    | -- |
| Other red oak        | 3,260       | 2,046                                    | 759     | 222     | 196     | 29       | --        | 8         | --        | --        | --        | --        | --    | -- |
| Other hickory        | 261         | 198                                      | --      | 25      | --      | 9        | 17        | 12        | --        | --        | --        | --        | --    | -- |
| Basswood             | 7,385       | 2,949                                    | 1,022   | 606     | 575     | 758      | 744       | 432       | 182       | 84        | 24        | 9         | --    | -- |
| Yellow birch         | 11,540      | 5,967                                    | 1,452   | 1,601   | 720     | 662      | 492       | 357       | 160       | 60        | 38        | 31        | --    | -- |
| Hard maple           | 65,963      | 28,238                                   | 14,845  | 9,297   | 5,980   | 4,181    | 1,836     | 899       | 377       | 172       | 92        | 46        | --    | -- |
| Soft maple           | 67,002      | 35,600                                   | 13,407  | 7,632   | 5,018   | 2,719    | 1,413     | 691       | 268       | 158       | 34        | 57        | 5     | -- |
| Elm                  | 3,354       | 2,481                                    | 507     | 165     | 38      | 51       | 58        | 33        | --        | 11        | 5         | 3         | 2     | -- |
| Black ash            | 23,632      | 12,417                                   | 5,340   | 3,180   | 1,582   | 619      | 336       | 112       | 35        | 5         | 6         | --        | --    | -- |
| White & green ash    | 5,726       | 3,369                                    | 615     | 312     | 270     | 437      | 335       | 213       | 94        | 72        | 5         | 4         | --    | -- |
| Bigtooth aspen       | 30,920      | 22,935                                   | 3,972   | 716     | 856     | 1,029    | 724       | 410       | 205       | 59        | 14        | --        | --    | -- |
| Quaking aspen        | 121,297     | 86,482                                   | 21,698  | 5,306   | 2,972   | 2,345    | 1,348     | 693       | 292       | 103       | 48        | 10        | --    | -- |
| Paper birch          | 17,096      | 6,417                                    | 2,420   | 2,864   | 2,985   | 1,401    | 756       | 177       | 50        | 26        | --        | --        | --    | -- |
| Black cherry         | 10,973      | 9,063                                    | 1,509   | 305     | 51      | 38       | 7         | --        | --        | --        | --        | --        | --    | -- |
| Other hardwoods      | 78          | 66                                       | --      | --      | --      | --       | 12        | --        | --        | --        | --        | --        | --    | -- |
| Total hardwoods      | 379,226     | 222,773                                  | 68,254  | 33,283  | 22,866  | 15,462   | 8,809     | 4,523     | 1,860     | 865       | 300       | 224       | 7     | 7  |
| Noncommercial spp.   | 31,734      | 28,897                                   | 2,530   | 143     | 164     | --       | --        | --        | --        | --        | --        | --        | --    | -- |
| All species          | 558,132     | 327,145                                  | 100,904 | 48,214  | 34,063  | 22,491   | 13,477    | 6,579     | 2,743     | 1,389     | 640       | 457       | 30    | 30 |

Table 5a. -- Number of all live trees on timberland by species group and diameter class, Nicolet, 1983 and 1996

| 1983 Nicolet         |             | (In thousand trees)                      |         |         |         |          |           |           |           |           |           |           |       |  |  |  |
|----------------------|-------------|------------------------------------------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|--|--|--|
|                      |             | Diameter class (inches at breast height) |         |         |         |          |           |           |           |           |           |           |       |  |  |  |
| Species group        | All classes | 1.0-2.9                                  | 3.0-4.9 | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0+ |  |  |  |
| Softwoods            |             |                                          |         |         |         |          |           |           |           |           |           |           |       |  |  |  |
| Jack pine            | 5,410       | 3,390                                    | 100     | 616     | 890     | 278      | 103       | 27        | 6         | --        | --        | --        | --    |  |  |  |
| Red pine             | 10,229      | 500                                      | 970     | 2,968   | 1,904   | 2,293    | 1,303     | 169       | 42        | 28        | 32        | 20        | --    |  |  |  |
| White pine           | 859         | 270                                      | --      | 108     | 25      | 40       | 132       | 28        | 67        | 127       | 24        | 38        | --    |  |  |  |
| White spruce         | 11,327      | 3,969                                    | 2,680   | 1,902   | 1,571   | 680      | 402       | 70        | 53        | --        | --        | --        | --    |  |  |  |
| Black spruce         | 12,307      | 4,319                                    | 4,588   | 2,762   | 443     | 168      | 17        | 10        | --        | --        | --        | --        | --    |  |  |  |
| Balsam fir           | 34,837      | 17,609                                   | 8,237   | 5,717   | 1,616   | 1,086    | 416       | 86        | 70        | --        | --        | --        | --    |  |  |  |
| Hemlock              | 1,918       | --                                       | 30      | 369     | 238     | 264      | 384       | 258       | 174       | 118       | 65        | 17        | 1     |  |  |  |
| Tamarack             | 3,152       | 800                                      | 600     | 1,236   | 464     | 12       | 40        | --        | --        | --        | --        | --        | --    |  |  |  |
| Northern white-cedar | 22,632      | 4,039                                    | 6,286   | 6,974   | 3,477   | 1,341    | 445       | 48        | 22        | --        | --        | --        | --    |  |  |  |
| Total softwoods      | 102,671     | 34,896                                   | 23,491  | 22,652  | 10,628  | 6,162    | 3,242     | 696       | 434       | 273       | 121       | 75        | 1     |  |  |  |
| Hardwoods            |             |                                          |         |         |         |          |           |           |           |           |           |           |       |  |  |  |
| Select white oak     | 32          | --                                       | --      | 32      | --      | --       | --        | --        | --        | --        | --        | --        | --    |  |  |  |
| Select red oak       | 3,647       | 300                                      | 280     | 1,780   | 535     | 488      | 172       | 53        | 32        | --        | --        | 7         | --    |  |  |  |
| Other red oak        | 770         | 710                                      | --      | --      | --      | 60       | --        | --        | --        | --        | --        | --        | --    |  |  |  |
| Basswood             | 19,697      | 4,210                                    | 5,050   | 4,632   | 2,638   | 2,003    | 719       | 259       | 110       | 35        | 29        | 12        | --    |  |  |  |
| Beech                | 115         | --                                       | --      | --      | --      | 115      | --        | --        | --        | --        | --        | --        | --    |  |  |  |
| Yellow birch         | 7,311       | 2,039                                    | 2,859   | 1,125   | 513     | 297      | 148       | 120       | 71        | 79        | 38        | 19        | 3     |  |  |  |
| Hard maple           | 94,200      | 44,508                                   | 25,279  | 12,913  | 6,921   | 2,870    | 786       | 316       | 195       | 195       | 106       | 108       | 3     |  |  |  |
| Soft maple           | 18,412      | 9,020                                    | 4,179   | 2,840   | 1,417   | 585      | 316       | 19        | 27        | 2         | --        | 7         | --    |  |  |  |
| Elm                  | 10,111      | 5,330                                    | 1,380   | 2,003   | 599     | 393      | 232       | 97        | 34        | 29        | 3         | 11        | --    |  |  |  |
| Black ash            | 7,362       | 3,040                                    | 2,810   | 770     | 687     | 21       | 4         | 30        | --        | --        | --        | --        | --    |  |  |  |
| White & green ash    | 1,108       | --                                       | --      | 229     | 445     | 182      | 164       | 75        | --        | 13        | --        | --        | --    |  |  |  |
| Balsam poplar        | 224         | --                                       | --      | 84      | 30      | 78       | --        | 25        | --        | --        | 7         | --        | --    |  |  |  |
| Bigtooth aspen       | 9,547       | 6,380                                    | --      | 783     | 1,358   | 557      | 352       | 99        | 8         | 10        | --        | --        | --    |  |  |  |
| Quaking aspen        | 104,019     | 81,594                                   | 9,515   | 3,905   | 4,214   | 2,711    | 1,323     | 418       | 268       | 52        | 12        | 7         | --    |  |  |  |
| Paper birch          | 11,224      | 2,400                                    | 3,230   | 2,328   | 1,880   | 931      | 252       | 124       | 78        | --        | --        | 1         | --    |  |  |  |
| Black cherry         | 14,953      | 7,927                                    | 4,509   | 1,178   | 801     | 245      | 69        | 211       | 13        | --        | --        | --        | --    |  |  |  |
| Other hardwoods      | 418         | --                                       | 350     | --      | 27      | --       | 40        | 1         | --        | --        | --        | --        | --    |  |  |  |
| Total hardwoods      | 303,150     | 167,458                                  | 59,441  | 34,602  | 22,065  | 11,536   | 4,577     | 1,847     | 836       | 415       | 195       | 172       | 6     |  |  |  |
| Noncommercial spp.   | 6,421       | 3,989                                    | 1,800   | 440     | 181     | 11       | --        | --        | --        | --        | --        | --        | --    |  |  |  |
| All species          | 412,242     | 206,343                                  | 84,732  | 57,694  | 32,874  | 17,709   | 7,819     | 2,543     | 1,270     | 688       | 316       | 247       | 7     |  |  |  |

(Table 5a continued)

| 1996 Nicolet         |             | (In thousand trees)                      |         |         |         |          |           |           |           |           |           |           |       |    |    |    |    |
|----------------------|-------------|------------------------------------------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|----|----|----|----|
| Species group        | All classes | Diameter class (inches at breast height) |         |         |         |          |           |           |           |           |           |           |       |    |    |    |    |
|                      |             | 1.0-2.9                                  | 3.0-4.9 | 5.0-6.9 | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0+ |    |    |    |    |
| Softwoods            |             |                                          |         |         |         |          |           |           |           |           |           |           |       |    |    |    |    |
| Jack pine            | 3,569       | 1,083                                    | 1,659   | 305     | 268     | 170      | 73        | 10        | 1         | --        | --        | --        | --    | -- | -- | -- | -- |
| Red pine             | 9,820       | 2,121                                    | 1,254   | 1,770   | 1,081   | 1,349    | 1,274     | 687       | 150       | 65        | 34        | 35        | --    | -- | -- | -- | -- |
| White pine           | 2,183       | 1,320                                    | 99      | 209     | 148     | 60       | 71        | 60        | 52        | 21        | 33        | 106       | 4     | -- | -- | -- | -- |
| White spruce         | 10,697      | 3,738                                    | 2,715   | 1,499   | 1,390   | 688      | 400       | 137       | 70        | 41        | 11        | 8         | --    | -- | -- | -- | -- |
| Black spruce         | 16,084      | 8,148                                    | 4,260   | 2,442   | 1,019   | 152      | 17        | 22        | 13        | 5         | 6         | --        | --    | -- | -- | -- | -- |
| Balsam fir           | 55,663      | 38,716                                   | 10,098  | 3,889   | 2,013   | 615      | 281       | 40        | 11        | --        | --        | --        | --    | -- | -- | -- | -- |
| Hemlock              | 2,577       | 273                                      | 72      | 118     | 303     | 349      | 480       | 325       | 260       | 168       | 129       | 94        | 6     | -- | -- | -- | -- |
| Tamarack             | 6,234       | 2,832                                    | 1,749   | 987     | 365     | 179      | 73        | 36        | 7         | --        | 6         | --        | --    | -- | -- | -- | -- |
| Northern white-cedar | 14,403      | 1,578                                    | 3,282   | 3,739   | 3,170   | 1,365    | 935       | 255       | 48        | 23        | --        | 8         | --    | -- | -- | -- | -- |
| Total softwoods      | 121,230     | 59,809                                   | 25,188  | 14,958  | 9,757   | 4,927    | 3,604     | 1,572     | 612       | 323       | 219       | 251       | 10    | -- | -- | -- | -- |
| Hardwoods            |             |                                          |         |         |         |          |           |           |           |           |           |           |       |    |    |    |    |
| Select white oak     | 147         | --                                       | 81      | --      | 16      | 150      | --        | --        | --        | --        | --        | --        | --    | -- | -- | -- | -- |
| Select red oak       | 3,722       | 1,698                                    | 294     | 246     | 535     | 274      | 233       | 285       | 68        | 50        | 30        | 8         | 1     | -- | -- | -- | -- |
| Other red oak        | 423         | 255                                      | 54      | 102     | --      | --       | --        | --        | --        | 12        | --        | --        | --    | -- | -- | -- | -- |
| Basswood             | 12,514      | 3,204                                    | 1,681   | 1,783   | 1,891   | 1,855    | 1,195     | 528       | 270       | 46        | 32        | 29        | --    | -- | -- | -- | -- |
| Beech                | 470         | 309                                      | --      | 53      | 76      | 20       | --        | --        | --        | --        | 8         | 4         | --    | -- | -- | -- | -- |
| Yellow birch         | 3,619       | 1,503                                    | 549     | 419     | 384     | 239      | 160       | 135       | 96        | 62        | 38        | 30        | 4     | -- | -- | -- | -- |
| Hard maple           | 74,472      | 31,477                                   | 17,128  | 10,486  | 7,298   | 4,317    | 1,883     | 709       | 409       | 357       | 198       | 196       | 14    | -- | -- | -- | -- |
| Soft maple           | 22,436      | 11,148                                   | 4,395   | 3,463   | 1,636   | 1,059    | 442       | 181       | 82        | 13        | 13        | 4         | --    | -- | -- | -- | -- |
| Elm                  | 6,067       | 4,027                                    | 1,482   | 350     | 126     | 44       | 22        | --        | 13        | 3         | --        | --        | --    | -- | -- | -- | -- |
| Black ash            | 14,756      | 6,277                                    | 5,494   | 2,107   | 693     | 114      | 38        | 29        | 4         | --        | --        | --        | --    | -- | -- | -- | -- |
| White & green ash    | 4,893       | 3,039                                    | 654     | 333     | 293     | 186      | 123       | 178       | 39        | 40        | 8         | --        | --    | -- | -- | -- | -- |
| Balsam poplar        | 1,023       | 315                                      | 255     | 127     | 154     | 47       | 25        | 76        | 9         | 15        | --        | --        | --    | -- | -- | -- | -- |
| Bigtooth aspen       | 13,154      | 9,210                                    | 2,241   | 352     | 204     | 386      | 336       | 284       | 106       | 27        | 4         | 4         | --    | -- | -- | -- | -- |
| Quaking aspen        | 97,171      | 66,763                                   | 18,060  | 4,920   | 2,801   | 2,277    | 1,290     | 647       | 246       | 104       | 51        | 12        | --    | -- | -- | -- | -- |
| Paper birch          | 11,208      | 4,378                                    | 1,861   | 1,693   | 1,824   | 938      | 312       | 100       | 70        | 32        | --        | --        | --    | -- | -- | -- | -- |
| Black cherry         | 10,554      | 7,372                                    | 1,557   | 640     | 474     | 271      | 111       | 91        | 30        | 8         | --        | --        | --    | -- | -- | -- | -- |
| Other hardwoods      | 22          | --                                       | --      | --      | --      | 13       | --        | --        | 5         | 4         | --        | --        | --    | -- | -- | -- | -- |
| Total hardwoods      | 276,651     | 150,975                                  | 55,786  | 27,074  | 18,405  | 12,090   | 6,170     | 3,243     | 1,447     | 773       | 382       | 287       | 19    | -- | -- | -- | -- |
| Noncommercial spp.   | 12,017      | 10,286                                   | 876     | 725     | 100     | 20       | 10        | --        | --        | --        | --        | --        | --    | -- | -- | -- | -- |
| All species          | 409,898     | 221,070                                  | 81,850  | 42,757  | 28,262  | 17,037   | 9,784     | 4,815     | 2,059     | 1,096     | 601       | 538       | 29    | -- | -- | -- | -- |

Table 6. -- Net volume of growing stock on timberland by species group and diameter class, Chequamegon, 1983 and 1996

| 1983 Chequamegon     |             |                                          |         |          |           |           |           |           |           |           |       |     |
|----------------------|-------------|------------------------------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|-----|
|                      |             | (In thousand cubic feet)                 |         |          |           |           |           |           |           |           |       |     |
| Species group        | All classes | Diameter class (inches at breast height) |         |          |           |           |           |           |           |           |       |     |
|                      |             | 5.0-6.9                                  | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0+ |     |
| Softwoods            |             |                                          |         |          |           |           |           |           |           |           |       |     |
| Jack pine            | 51,879      | 9,682                                    | 22,131  | 14,049   | 5,865     | 152       | --        | --        | --        | --        | --    | --  |
| Red pine             | 56,760      | 4,294                                    | 15,646  | 21,727   | 11,417    | 1,223     | 1,069     | 424       | 557       | 403       | --    | --  |
| White pine           | 32,366      | 483                                      | 3,599   | 5,658    | 5,496     | 5,211     | 4,644     | 4,101     | 1,328     | 1,846     | --    | --  |
| White spruce         | 61,978      | 7,465                                    | 24,969  | 15,676   | 9,689     | 3,388     | 562       | 229       | --        | --        | --    | --  |
| Black spruce         | 7,414       | 3,872                                    | 2,164   | 1,251    | --        | --        | --        | 127       | --        | --        | --    | --  |
| Balsam fir           | 33,681      | 10,659                                   | 10,421  | 8,701    | 1,353     | 1,628     | 919       | --        | --        | --        | --    | --  |
| Hemlock              | 17,728      | 792                                      | 758     | 2,322    | 2,252     | 3,657     | 2,478     | 3,350     | 504       | 1,444     | 171   | --  |
| Tamarack             | 8,392       | 2,384                                    | 5,369   | 402      | 237       | --        | --        | --        | 157       | --        | --    | --  |
| Northern white-cedar | 31,194      | 5,706                                    | 9,123   | 6,170    | 7,214     | 1,307     | 935       | 582       | --        | --        | --    | --  |
| Total softwoods      | 301,392     | 45,337                                   | 94,180  | 75,956   | 43,523    | 16,566    | 10,607    | 8,813     | 2,546     | 3,693     | --    | 171 |
| Hardwoods            |             |                                          |         |          |           |           |           |           |           |           |       |     |
| Select white oak     | 3,758       | 914                                      | 2,206   | 638      | --        | --        | --        | --        | --        | --        | --    | --  |
| Select red oak       | 76,219      | 14,218                                   | 20,119  | 19,314   | 10,257    | 5,377     | 2,081     | 1,297     | 1,862     | 1,694     | --    | --  |
| Other red oak        | 168         | 168                                      | --      | --       | --        | --        | --        | --        | --        | --        | --    | --  |
| Other hickory        | 1,139       | --                                       | 377     | 244      | 518       | --        | --        | --        | --        | --        | --    | --  |
| Basswood             | 46,120      | 3,650                                    | 6,061   | 12,143   | 14,321    | 6,022     | 2,783     | --        | 919       | 221       | --    | --  |
| Yellow birch         | 25,390      | 2,933                                    | 4,279   | 7,788    | 4,506     | 1,646     | 1,407     | 1,501     | 417       | 913       | --    | --  |
| Hard maple           | 103,512     | 26,049                                   | 30,391  | 21,178   | 12,052    | 7,253     | 2,833     | 1,529     | 950       | 1,277     | --    | --  |
| Soft maple           | 80,434      | 21,422                                   | 20,359  | 13,133   | 9,085     | 7,633     | 4,190     | 1,544     | 2,711     | 357       | --    | --  |
| Elm                  | 5,297       | 705                                      | 1,075   | 476      | 975       | 949       | 598       | 185       | 334       | --        | --    | --  |
| Black ash            | 19,002      | 5,201                                    | 4,052   | 5,969    | 2,696     | 867       | 217       | --        | --        | --        | --    | --  |
| White & green ash    | 14,395      | 340                                      | 1,864   | 4,392    | 2,256     | 2,708     | 2,065     | --        | 770       | --        | --    | --  |
| Bigtooth aspen       | 55,479      | 4,769                                    | 13,470  | 18,678   | 11,423    | 4,253     | 990       | 1,406     | 490       | --        | --    | --  |
| Quaking aspen        | 78,925      | 14,971                                   | 23,034  | 18,144   | 14,569    | 5,005     | 1,790     | 1,412     | --        | --        | --    | --  |
| Paper birch          | 56,106      | 10,962                                   | 20,676  | 15,676   | 6,056     | 2,450     | 286       | --        | --        | --        | --    | --  |
| Other hardwoods      | 422         | --                                       | --      | 422      | --        | --        | --        | --        | --        | --        | --    | --  |
| Total hardwoods      | 566,366     | 106,302                                  | 147,963 | 138,195  | 88,714    | 44,163    | 19,240    | 8,874     | 8,453     | 4,462     | --    | 0   |
| All species          | 867,758     | 151,639                                  | 242,143 | 214,151  | 132,237   | 60,729    | 29,847    | 17,687    | 10,999    | 8,155     | --    | 171 |

(Table 6 continued)

(In thousand cubic feet)

| 1996 Chequamegon     |             | Diameter class (inches at breast height) |         |          |           |           |           |           |           |           |       |  |
|----------------------|-------------|------------------------------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|--|
| Species group        | All classes | 5.0-6.9                                  | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0+ |  |
| Softwoods            |             |                                          |         |          |           |           |           |           |           |           |       |  |
| Jack pine            | 20,297      | 1,281                                    | 4,974   | 5,924    | 4,785     | 2,791     | 209       | --        | 333       | --        | --    |  |
| Red pine             | 72,450      | 4,531                                    | 9,816   | 12,257   | 19,382    | 10,803    | 6,711     | 5,210     | 2,352     | 1,388     | --    |  |
| White pine           | 39,108      | 823                                      | 918     | 1,441    | 2,856     | 4,924     | 5,545     | 6,201     | 7,116     | 7,162     | 2,122 |  |
| White spruce         | 35,139      | 4,525                                    | 6,520   | 6,613    | 7,276     | 4,683     | 1,957     | 1,835     | 764       | 966       | --    |  |
| Black spruce         | 14,976      | 6,152                                    | 4,021   | 2,097    | 794       | 221       | 742       | 275       | 674       | --        | --    |  |
| Balsam fir           | 34,157      | 9,199                                    | 10,012  | 8,132    | 4,401     | 1,679     | 520       | --        | 214       | --        | --    |  |
| Hemlock              | 38,255      | 699                                      | 1,091   | 2,440    | 4,162     | 5,493     | 6,461     | 4,738     | 5,151     | 7,135     | 885   |  |
| Tamarack             | 18,387      | 3,600                                    | 6,935   | 3,921    | 2,654     | 499       | 194       | 373       | 211       | --        | --    |  |
| Northern white-cedar | 61,118      | 4,299                                    | 11,780  | 15,951   | 15,761    | 8,576     | 1,916     | 1,572     | 750       | 513       | --    |  |
| Total softwoods      | 333,887     | 35,109                                   | 56,067  | 58,776   | 62,071    | 39,669    | 24,255    | 20,204    | 17,565    | 17,164    | 3,007 |  |
| Hardwoods            |             |                                          |         |          |           |           |           |           |           |           |       |  |
| Select white oak     | 1,158       | 218                                      | 498     | 283      | 159       | --        | --        | --        | --        | --        | --    |  |
| Select red oak       | 59,554      | 2,104                                    | 8,535   | 10,837   | 10,396    | 11,113    | 5,874     | 4,623     | 1,736     | 4,336     | --    |  |
| Other red oak        | 1,181       | 492                                      | 536     | 153      | --        | --        | --        | --        | --        | --        | --    |  |
| Other hickory        | 677         | 87                                       | --      | 139      | 141       | 310       | --        | --        | --        | --        | --    |  |
| Basswood             | 50,329      | 1,912                                    | 3,316   | 9,396    | 13,349    | 10,900    | 6,171     | 3,772     | 728       | 785       | --    |  |
| Yellow birch         | 28,829      | 2,928                                    | 2,815   | 4,675    | 5,143     | 5,724     | 2,976     | 1,767     | 1,418     | 1,383     | --    |  |
| Hard maple           | 165,617     | 22,850                                   | 33,356  | 40,260   | 26,246    | 18,366    | 11,295    | 6,230     | 3,986     | 3,028     | --    |  |
| Soft maple           | 116,094     | 16,594                                   | 24,558  | 23,926   | 20,177    | 13,011    | 6,774     | 4,947     | 1,537     | 3,689     | 881   |  |
| Elm                  | 3,906       | 469                                      | 101     | 339      | 957       | 770       | --        | 489       | 291       | 198       | 292   |  |
| Black ash            | 34,185      | 8,466                                    | 9,549   | 6,333    | 5,615     | 2,638     | 1,021     | 204       | 359       | --        | --    |  |
| White & green ash    | 23,599      | 997                                      | 1,401   | 4,436    | 4,996     | 5,001     | 3,065     | 3,019     | 327       | 357       | --    |  |
| Bigtooth aspen       | 45,614      | 1,926                                    | 5,096   | 10,683   | 11,463    | 8,027     | 5,914     | 1,690     | 815       | --        | --    |  |
| Quaking aspen        | 92,592      | 12,619                                   | 16,151  | 22,079   | 18,605    | 13,279    | 5,434     | 3,129     | 1,296     | --        | --    |  |
| Paper birch          | 57,873      | 7,110                                    | 17,744  | 14,745   | 11,810    | 4,133     | 1,411     | 920       | --        | --        | --    |  |
| Black cherry         | 527         | 191                                      | 184     | --       | 152       | --        | --        | --        | --        | --        | --    |  |
| Other hardwoods      | 179         | --                                       | --      | --       | 179       | --        | --        | --        | --        | --        | --    |  |
| Total hardwoods      | 681,914     | 78,963                                   | 123,840 | 148,284  | 129,388   | 93,272    | 49,935    | 30,790    | 12,493    | 13,776    | 1,173 |  |
| All species          | 1,015,801   | 114,072                                  | 179,907 | 207,060  | 191,459   | 132,941   | 74,190    | 50,994    | 30,058    | 30,940    | 4,180 |  |

Table 6a. -- Net volume of growing stock on timberland by species group and diameter class, Nicolet, 1983 and 1996

| 1983 Nicolet         |             |                          |         |          |           |           |           |           |           |           |       |    |     |
|----------------------|-------------|--------------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|----|-----|
| Species group        | All classes | (In thousand cubic feet) |         |          |           |           |           |           |           |           |       |    |     |
|                      |             | 5.0-6.9                  | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0+ |    |     |
| Softwoods            |             |                          |         |          |           |           |           |           |           |           |       |    |     |
| Jack pine            | 10,500      | 1,610                    | 4,431   | 2,107    | 1,480     | 673       | 199       | --        | --        | --        | --    | -- | --  |
| Red pine             | 69,638      | 5,928                    | 11,164  | 22,729   | 19,839    | 4,009     | 1,522     | 1,319     | 1,788     | 1,340     | --    | -- | --  |
| White pine           | 17,616      | 170                      | 92      | 398      | 2,298     | 790       | 2,580     | 5,946     | 1,603     | 3,739     | --    | -- | --  |
| White spruce         | 30,912      | 5,137                    | 8,417   | 6,869    | 6,744     | 1,902     | 1,843     | --        | --        | --        | --    | -- | --  |
| Black spruce         | 12,465      | 7,874                    | 2,472   | 1,538    | 278       | 292       | --        | 11        | --        | --        | --    | -- | --  |
| Balsam fir           | 45,915      | 13,742                   | 10,198  | 10,842   | 6,388     | 2,161     | 2,584     | --        | --        | --        | --    | -- | --  |
| Hemlock              | 27,037      | 513                      | 963     | 2,231    | 4,387     | 4,942     | 4,980     | 4,385     | 3,086     | 1,446     | 104   | -- | 104 |
| Tamarack             | 7,644       | 3,370                    | 3,319   | 173      | 782       | --        | --        | --        | --        | --        | --    | -- | --  |
| Northern white-cedar | 46,543      | 15,456                   | 16,283  | 8,805    | 4,434     | 976       | 576       | 13        | --        | --        | --    | -- | --  |
| Total softwoods      | 268,270     | 53,800                   | 57,339  | 55,692   | 46,630    | 15,745    | 14,284    | 11,674    | 6,477     | 6,525     | 104   | -- | 104 |
| Hardwoods            |             |                          |         |          |           |           |           |           |           |           |       |    |     |
| Select white oak     | 83          | 83                       | --      | --       | --        | --        | --        | --        | --        | --        | --    | -- | --  |
| Select red oak       | 16,571      | 4,655                    | 2,465   | 4,747    | 2,832     | 598       | 719       | --        | --        | 555       | --    | -- | --  |
| Basswood             | 77,596      | 11,924                   | 16,205  | 22,296   | 12,322    | 6,716     | 3,717     | 1,677     | 1,692     | 1,047     | --    | -- | --  |
| Yellow birch         | 16,254      | 1,906                    | 1,777   | 1,817    | 2,348     | 1,789     | 1,679     | 3,017     | 1,383     | 439       | 99    | -- | 99  |
| Hard maple           | 149,659     | 36,001                   | 41,353  | 28,559   | 10,061    | 6,596     | 6,267     | 8,139     | 5,228     | 7,089     | 366   | -- | 366 |
| Soft maple           | 27,464      | 7,528                    | 8,805   | 5,638    | 3,461     | 265       | 881       | 77        | --        | 809       | --    | -- | --  |
| Elm                  | 19,824      | 4,657                    | 2,886   | 3,935    | 3,365     | 2,056     | 1,102     | 1,172     | 147       | 504       | --    | -- | --  |
| Black ash            | 6,874       | 1,884                    | 3,940   | 241      | 69        | 740       | --        | --        | --        | --        | --    | -- | --  |
| White & green ash    | 10,452      | 568                      | 2,737   | 1,944    | 2,559     | 1,999     | --        | 645       | --        | --        | --    | -- | --  |
| Balsam poplar        | 2,558       | 293                      | 214     | 845      | --        | 773       | --        | --        | 433       | --        | --    | -- | --  |
| Bigtooth aspen       | 23,856      | 2,496                    | 5,545   | 6,231    | 6,240     | 2,536     | 337       | 471       | --        | --        | --    | -- | --  |
| Quaking aspen        | 110,984     | 11,423                   | 27,334  | 29,246   | 20,765    | 10,384    | 9,419     | 1,659     | 754       | --        | --    | -- | --  |
| Paper birch          | 36,294      | 6,456                    | 11,430  | 10,132   | 3,738     | 2,460     | 1,961     | --        | --        | 117       | --    | -- | --  |
| Black cherry         | 15,301      | 2,938                    | 4,050   | 2,299    | 1,424     | 4,188     | 402       | --        | --        | --        | --    | -- | --  |
| Other hardwoods      | 1,012       | --                       | 226     | --       | 786       | --        | --        | --        | --        | --        | --    | -- | --  |
| Total hardwoods      | 514,782     | 92,812                   | 128,967 | 117,930  | 69,970    | 41,100    | 26,484    | 16,857    | 9,637     | 10,560    | 465   | -- | 465 |
| All species          | 783,052     | 146,612                  | 186,306 | 173,622  | 116,600   | 56,845    | 40,768    | 28,531    | 16,114    | 17,085    | 569   | -- | 569 |

(Table 6a continued)

(In thousand cubic feet)

| 1996 Nicolet         |             | Diameter class (inches at breast height) |         |          |           |           |           |           |           |           |       |  |
|----------------------|-------------|------------------------------------------|---------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|--|
| Species group        | All classes | 5.0-6.9                                  | 7.0-8.9 | 9.0-10.9 | 11.0-12.9 | 13.0-14.9 | 15.0-16.9 | 17.0-18.9 | 19.0-20.9 | 21.0-28.9 | 29.0+ |  |
| Softwoods            |             |                                          |         |          |           |           |           |           |           |           |       |  |
| Jack pine            | 5,398       | 761                                      | 1,374   | 1,792    | 1,165     | 262       | 44        | --        | --        | --        | --    |  |
| Red pine             | 73,362      | 4,600                                    | 6,490   | 13,691   | 20,706    | 15,767    | 4,668     | 2,762     | 2,047     | 2,631     | --    |  |
| White pine           | 19,316      | 424                                      | 542     | 447      | 1,036     | 1,450     | 1,328     | 992       | 2,019     | 10,396    | 682   |  |
| White spruce         | 35,570      | 4,046                                    | 8,079   | 7,194    | 6,947     | 3,768     | 2,502     | 1,785     | 686       | 563       | --    |  |
| Black spruce         | 16,135      | 6,939                                    | 5,643   | 1,641    | 325       | 577       | 432       | 228       | 350       | --        | --    |  |
| Balsam fir           | 33,683      | 10,277                                   | 11,064  | 6,433    | 4,749     | 786       | 374       | --        | --        | --        | --    |  |
| Hemlock              | 42,402      | 219                                      | 1,445   | 2,568    | 5,955     | 6,739     | 6,484     | 5,868     | 6,139     | 6,119     | 866   |  |
| Tamarack             | 10,515      | 3,360                                    | 2,445   | 1,863    | 1,314     | 1,008     | 211       | --        | 314       | --        | --    |  |
| Northern white-cedar | 47,540      | 7,884                                    | 13,758  | 10,055   | 10,045    | 4,221     | 770       | 437       | --        | 370       | --    |  |
| Total softwoods      | 283,921     | 38,510                                   | 50,840  | 45,684   | 52,242    | 34,578    | 16,813    | 12,072    | 11,555    | 20,079    | 1,548 |  |
| Hardwoods            |             |                                          |         |          |           |           |           |           |           |           |       |  |
| Select white oak     | 546         | --                                       | 94      | 452      | --        | --        | --        | --        | --        | --        | --    |  |
| Select red oak       | 23,384      | 689                                      | 2,914   | 2,685    | 3,542     | 6,230     | 2,247     | 2,340     | 1,762     | 975       | --    |  |
| Other red oak        | 646         | 275                                      | --      | --       | --        | --        | --        | 371       | --        | --        | --    |  |
| Basswood             | 89,787      | 5,112                                    | 12,403  | 22,093   | 21,234    | 13,385    | 9,275     | 2,103     | 1,844     | 2,338     | --    |  |
| Beech                | 1,157       | 178                                      | 196     | 214      | --        | --        | --        | --        | 569       | --        | --    |  |
| Yellow birch         | 17,307      | 847                                      | 2,204   | 2,041    | 1,994     | 2,092     | 2,494     | 2,460     | 1,624     | 1,551     | --    |  |
| Hard maple           | 215,856     | 28,568                                   | 43,904  | 45,030   | 28,899    | 15,419    | 12,656    | 14,303    | 10,586    | 15,057    | 1,434 |  |
| Soft maple           | 40,984      | 7,898                                    | 9,684   | 10,181   | 6,542     | 3,498     | 1,941     | 194       | 658       | 388       | --    |  |
| Elm                  | 2,606       | 879                                      | 636     | 344      | 328       | --        | 282       | 137       | --        | --        | --    |  |
| Black ash            | 11,924      | 5,221                                    | 4,247   | 992      | 609       | 697       | 158       | --        | --        | --        | --    |  |
| White & green ash    | 13,867      | 776                                      | 1,659   | 1,821    | 2,040     | 4,077     | 1,176     | 1,825     | 493       | --        | --    |  |
| Balsam poplar        | 5,662       | 407                                      | 1,164   | 576      | 408       | 2,053     | 353       | 701       | --        | --        | --    |  |
| Bigtooth aspen       | 24,681      | 1,132                                    | 993     | 3,463    | 6,313     | 7,354     | 3,752     | 1,383     | 291       | --        | --    |  |
| Quaking aspen        | 101,460     | 13,574                                   | 16,807  | 23,183   | 20,563    | 14,292    | 7,540     | 3,427     | 1,674     | 400       | --    |  |
| Paper birch          | 37,572      | 5,182                                    | 11,637  | 10,468   | 4,412     | 2,276     | 2,348     | 1,249     | --        | --        | --    |  |
| Black cherry         | 11,788      | 1,598                                    | 2,817   | 2,355    | 1,628     | 2,152     | 830       | 408       | --        | --        | --    |  |
| Other hardwoods      | 572         | --                                       | --      | 213      | --        | --        | 172       | 187       | --        | --        | --    |  |
| Total hardwoods      | 599,799     | 72,336                                   | 111,359 | 126,111  | 98,512    | 73,525    | 45,224    | 31,088    | 19,501    | 20,709    | 1,434 |  |
| All species          | 883,720     | 110,846                                  | 162,199 | 171,795  | 150,754   | 108,103   | 62,037    | 43,160    | 31,056    | 40,788    | 2,982 |  |

Table 7. -- Net volume of all live trees, growing stock, and sawtimber on timberland by Forest and major species group, Chequamegon-Nicolet National Forest, 1996

(In thousand cubic feet)

| Land base   | All live trees |                     |         |         |             | Growing-stock trees |         |         |         |         |
|-------------|----------------|---------------------|---------|---------|-------------|---------------------|---------|---------|---------|---------|
|             | All species    | Major species group |         |         | All species | Major species group |         |         |         |         |
|             |                | Pine                | Other   | Soft    |             | Hard                | Pine    | Other   | Soft    | Hard    |
| Chequamegon | 1,122,245      | 133,800             | 220,872 | 452,641 | 314,932     | 1,015,801           | 131,855 | 202,032 | 401,120 | 280,794 |
| Nicolet     | 932,056        | 98,844              | 192,175 | 347,615 | 293,422     | 883,720             | 98,076  | 185,845 | 325,932 | 273,867 |
| Total       | 2,054,301      | 232,644             | 413,047 | 800,256 | 608,354     | 1,899,521           | 229,931 | 387,877 | 727,052 | 554,661 |

(In thousand board feet) <sup>1</sup>

| Land base   | Sawtimber   |                     |           |           |           |
|-------------|-------------|---------------------|-----------|-----------|-----------|
|             | All species | Major species group |           |           | Hard      |
|             |             | Pine                | Other     | Soft      |           |
| Chequamegon | 2,737,480   | 572,807             | 693,411   | 828,927   | 642,335   |
| Nicolet     | 2,326,828   | 443,498             | 574,732   | 669,526   | 639,072   |
| Total       | 5,064,308   | 1,016,305           | 1,268,143 | 1,498,453 | 1,281,407 |

<sup>1</sup> International 1/4-inch rule.

Table 8. -- Net volume of all live trees on timberland by species group and forest type, Chequamegon, 1996

(In thousand cubic feet)

| Species group        | All types | Forest type |          |            |            |              |              |                      |          |             |                |                |         | Paper birch | Balsam poplar | Non-stocked |
|----------------------|-----------|-------------|----------|------------|------------|--------------|--------------|----------------------|----------|-------------|----------------|----------------|---------|-------------|---------------|-------------|
|                      |           | Jack pine   | Red pine | White pine | Balsam fir | White spruce | Black spruce | Northern white-cedar | Tamarack | Oak-hickory | Elm-soft maple | Maple-basswood | Aspen   |             |               |             |
| Softwoods            |           |             |          |            |            |              |              |                      |          |             |                |                |         |             |               |             |
| Jack pine            | 21,256    | 14,527      | 1,626    | 1,036      | --         | --           | 316          | --                   | --       | --          | 408            | 186            | 3,157   | --          | --            | --          |
| Red pine             | 72,684    | 1,944       | 61,677   | 2,641      | --         | --           | --           | --                   | --       | --          | --             | 283            | 6,139   | --          | --            | --          |
| White pine           | 39,860    | --          | 4,899    | 12,957     | 51         | --           | 329          | --                   | 1,000    | --          | 1,714          | 12,674         | 4,782   | 737         | --            | 717         |
| White spruce         | 35,431    | --          | 73       | --         | 2,761      | 21,954       | 149          | 215                  | --       | --          | 850            | 3,132          | 5,856   | 327         | --            | 114         |
| Black spruce         | 14,976    | --          | --       | --         | 1,525      | 580          | 6,790        | 1,923                | 858      | --          | 242            | 878            | 1,727   | 453         | --            | --          |
| Balsam fir           | 34,905    | --          | 108      | 1,531      | 6,542      | 375          | 500          | 2,079                | --       | --          | 4,712          | 8,663          | 9,452   | 943         | --            | --          |
| Hemlock              | 42,085    | --          | --       | --         | 199        | --           | 37           | 803                  | --       | --          | 2,329          | 38,057         | 392     | 268         | --            | --          |
| Tamarack             | 20,039    | --          | --       | --         | 1,555      | 558          | 4,495        | 489                  | 9,605    | --          | 443            | 922            | 1,125   | 773         | --            | 74          |
| Northern white-cedar | 73,436    | --          | --       | 268        | 4,058      | --           | 1,263        | 36,647               | 157      | --          | 10,953         | 18,187         | 784     | 1,119       | --            | --          |
| Total softwoods      | 354,672   | 16,471      | 68,383   | 18,433     | 16,691     | 23,467       | 13,879       | 42,156               | 11,620   | --          | 21,651         | 82,982         | 33,414  | 4,620       | --            | 905         |
| Hardwoods            |           |             |          |            |            |              |              |                      |          |             |                |                |         |             |               |             |
| Select white oak     | 1,158     | --          | --       | --         | --         | --           | --           | --                   | --       | 1,158       | --             | --             | --      | --          | --            | --          |
| Select red oak       | 62,590    | --          | 387      | 129        | --         | 265          | --           | --                   | --       | 16,830      | 883            | 34,444         | 6,772   | 2,880       | --            | --          |
| Other red oak        | 1,969     | 51          | 649      | 138        | --         | --           | --           | --                   | --       | 946         | --             | 46             | 139     | --          | --            | --          |
| Other hickory        | 805       | --          | --       | --         | --         | --           | --           | --                   | --       | --          | --             | 805            | --      | --          | --            | --          |
| Basswood             | 52,475    | 212         | 217      | --         | --         | 112          | --           | --                   | --       | --          | 149            | 50,319         | 1,466   | --          | --            | --          |
| Yellow birch         | 36,615    | --          | --       | --         | 445        | --           | 220          | 426                  | --       | --          | 3,377          | 31,335         | 812     | --          | --            | --          |
| Hard maple           | 186,678   | 133         | --       | --         | 99         | 195          | --           | --                   | --       | 793         | 1,095          | 178,347        | 3,920   | 2,096       | --            | --          |
| Soft maple           | 132,246   | --          | 618      | --         | 906        | 129          | 362          | --                   | --       | 1,999       | 17,027         | 94,016         | 10,300  | 6,889       | --            | --          |
| Elm                  | 4,174     | --          | --       | --         | --         | --           | --           | --                   | --       | --          | 283            | 3,367          | 463     | 61          | --            | --          |
| Black ash            | 35,129    | --          | --       | --         | 1,291      | --           | --           | 922                  | --       | 321         | 15,725         | 15,953         | 917     | --          | --            | --          |
| White & green ash    | 24,874    | --          | --       | --         | --         | --           | --           | --                   | --       | --          | 1,969          | 21,963         | 471     | 471         | --            | --          |
| Bigtooth aspen       | 53,451    | --          | 1,544    | --         | --         | 1,903        | --           | --                   | --       | 859         | --             | 10,367         | 36,433  | 2,345       | --            | --          |
| Quaking aspen        | 108,936   | 735         | 1,423    | 205        | 2,549      | 1,892        | 403          | 314                  | --       | 2,454       | 4,332          | 20,395         | 70,663  | 3,571       | --            | --          |
| Paper birch          | 64,078    | --          | 214      | 879        | 315        | 848          | 413          | 950                  | --       | 2,390       | 1,375          | 23,812         | 13,823  | 19,059      | --            | --          |
| Black cherry         | 1,294     | 58          | --       | --         | 278        | 60           | --           | --                   | --       | --          | --             | 631            | 267     | --          | --            | --          |
| Other hardwoods      | 179       | --          | --       | --         | --         | --           | --           | --                   | --       | --          | --             | 179            | --      | --          | --            | --          |
| Total hardwoods      | 766,651   | 1,189       | 5,052    | 1,351      | 5,883      | 5,404        | 1,398        | 2,612                | --       | 27,750      | 46,215         | 485,979        | 146,446 | 37,372      | --            | --          |
| Noncommercial spp.   | 922       | --          | --       | --         | --         | --           | --           | --                   | --       | --          | 79             | 763            | 80      | --          | --            | --          |
| All species          | 1,122,245 | 17,660      | 73,435   | 19,784     | 22,574     | 28,871       | 15,277       | 44,768               | 11,620   | 27,750      | 67,945         | 569,724        | 179,940 | 41,992      | --            | 905         |

Table 8a. -- Net volume of all live trees on timberland by species group and forest type, Nicolet, 1996

(In thousand cubic feet)

| Species group        | Forest type |           |          |            |            |              |              |                      |          |             |                    |                |         |             |               |             |
|----------------------|-------------|-----------|----------|------------|------------|--------------|--------------|----------------------|----------|-------------|--------------------|----------------|---------|-------------|---------------|-------------|
|                      | All types   | Jack pine | Red pine | White pine | Balsam fir | White spruce | Black spruce | Northern white-cedar | Tamarack | Oak-hickory | Elm-ash-soft maple | Maple-basswood | Aspen   | Paper birch | Balsam poplar | Non-stocked |
| Softwoods            |             |           |          |            |            |              |              |                      |          |             |                    |                |         |             |               |             |
| Jack pine            | 5,493       | 5,010     | 483      | --         | --         | --           | --           | --                   | --       | --          | --                 | --             | --      | --          | --            | --          |
| Red pine             | 73,463      | 3,471     | 64,578   | 1,136      | --         | --           | 392          | --                   | --       | --          | --                 | 511            | 3,375   | --          | --            | --          |
| White pine           | 19,888      | 302       | 200      | 6,084      | 874        | --           | 1,117        | 278                  | --       | --          | 647                | 4,467          | 4,803   | 1,116       | --            | --          |
| White spruce         | 36,099      | 313       | 1,877    | 266        | 3,063      | 17,901       | --           | 1,302                | --       | --          | 726                | 5,180          | 4,500   | 971         | --            | --          |
| Black spruce         | 16,365      | 535       | 166      | 144        | 1,821      | --           | 8,996        | 2,503                | 673      | --          | --                 | 167            | 1,360   | --          | --            | --          |
| Balsam fir           | 34,020      | --        | 1,065    | 104        | 6,680      | 545          | 287          | 1,476                | 343      | --          | 3,540              | 8,005          | 9,637   | 2,338       | --            | --          |
| Hemlock              | 44,223      | --        | --       | 200        | 146        | 335          | --           | 607                  | --       | --          | 498                | 39,976         | 1,738   | 723         | --            | --          |
| Tamarack             | 10,678      | --        | --       | --         | 1,715      | --           | 3,309        | 1,143                | 3,507    | --          | 841                | 163            | --      | --          | --            | --          |
| Northern white-cedar | 50,790      | --        | --       | --         | 2,640      | --           | 370          | 33,714               | --       | --          | 5,616              | 6,356          | 1,217   | 877         | --            | --          |
| Total softwoods      | 291,019     | 9,631     | 68,369   | 7,934      | 16,939     | 18,781       | 14,471       | 41,023               | 4,523    | --          | 11,868             | 64,825         | 26,630  | 6,025       | --            | --          |
| Hardwoods            |             |           |          |            |            |              |              |                      |          |             |                    |                |         |             |               |             |
| Select white oak     | 546         | --        | --       | --         | --         | --           | --           | --                   | --       | 348         | --                 | 198            | --      | --          | --            | --          |
| Select red oak       | 23,976      | --        | 2,151    | 222        | --         | --           | --           | --                   | --       | 8,964       | --                 | 6,245          | 4,976   | 1,418       | --            | --          |
| Other red oak        | 646         | --        | 371      | --         | --         | --           | 275          | --                   | --       | --          | --                 | --             | --      | --          | --            | --          |
| Basswood             | 91,453      | --        | 361      | --         | --         | 400          | --           | --                   | --       | --          | --                 | 87,842         | 2,850   | --          | --            | --          |
| Beech                | 1,666       | --        | --       | --         | --         | --           | --           | --                   | --       | --          | --                 | 1,593          | 73      | --          | --            | --          |
| Yellow birch         | 19,860      | --        | --       | --         | 177        | --           | 47           | 614                  | --       | --          | 1,387              | 17,380         | 211     | 44          | --            | --          |
| Hard maple           | 231,063     | --        | 2,124    | --         | --         | 739          | --           | --                   | --       | --          | --                 | 220,640        | 7,310   | 250         | --            | --          |
| Soft maple           | 44,669      | --        | 211      | 322        | 516        | --           | 215          | 336                  | --       | 1,418       | 3,154              | 29,365         | 5,839   | 3,293       | --            | --          |
| Elm                  | 2,929       | --        | 606      | --         | --         | 384          | --           | --                   | --       | --          | 290                | 1,331          | 318     | --          | --            | --          |
| Black ash            | 12,136      | --        | --       | --         | 914        | --           | --           | 1,504                | --       | --          | 6,765              | 2,405          | 548     | --          | --            | --          |
| White & green ash    | 14,561      | --        | 214      | --         | --         | --           | --           | --                   | --       | --          | 502                | 13,283         | 243     | 319         | --            | --          |
| Balsam poplar        | 5,662       | --        | --       | --         | 333        | --           | --           | 188                  | --       | --          | 141                | 3,721          | 1,169   | 110         | --            | --          |
| Bigtooth aspen       | 26,106      | --        | --       | --         | --         | --           | --           | --                   | --       | 1,533       | 153                | 6,798          | 17,622  | --          | --            | --          |
| Quaking aspen        | 109,606     | 1,959     | 4,526    | 141        | 2,979      | 2,976        | 2,108        | 556                  | --       | 417         | 2,337              | 34,948         | 54,360  | 2,299       | --            | --          |
| Paper birch          | 39,849      | --        | 221      | 260        | 111        | 616          | 280          | 1,819                | --       | 365         | 821                | 17,232         | 5,994   | 12,130      | --            | --          |
| Black cherry         | 13,608      | --        | 453      | --         | 295        | 865          | --           | 295                  | --       | --          | 35                 | 8,658          | 3,007   | --          | --            | --          |
| Other hardwoods      | 572         | --        | --       | --         | --         | --           | --           | --                   | --       | --          | --                 | 572            | --      | --          | --            | --          |
| Total hardwoods      | 638,908     | 1,959     | 11,238   | 945        | 5,325      | 5,980        | 2,925        | 5,312                | --       | 13,045      | 15,585             | 452,211        | 104,520 | 19,863      | --            | --          |
| Noncommercial spp.   | 2,129       | --        | --       | --         | --         | --           | --           | --                   | --       | --          | --                 | 1,933          | 86      | 110         | --            | --          |
| All species          | 932,056     | 11,590    | 79,607   | 8,879      | 22,264     | 24,761       | 17,396       | 46,335               | 4,523    | 13,045      | 27,453             | 518,969        | 131,236 | 25,888      | --            | --          |

Table 9. -- Area of timberland by forest type and stand-age class, Chequamegon-Nicolet National Forest, 1996

(In thousand acres)

| Land base<br>forest type | Stand-age class (years) |        |         |         |         |          |           |           |      |    |     | 141+ |
|--------------------------|-------------------------|--------|---------|---------|---------|----------|-----------|-----------|------|----|-----|------|
|                          | All classes             | 1 - 20 | 21 - 40 | 41 - 60 | 61 - 80 | 81 - 100 | 101 - 120 | 121 - 140 | 141+ |    |     |      |
| Chequamegon              |                         |        |         |         |         |          |           |           |      |    |     |      |
| Jack pine                | 19.0                    | 4.7    | 5.2     | 7.9     | 1.2     | --       | --        | --        | --   | -- | --  |      |
| Red pine                 | 48.0                    | 12.8   | 12.6    | 20.5    | 2.1     | --       | --        | --        | --   | -- | --  |      |
| White pine               | 9.4                     | --     | --      | 6.4     | 1.5     | 1.5      | --        | --        | --   | -- | --  |      |
| Balsam fir               | 21.4                    | 7.1    | 1.7     | 5.7     | 5.6     | --       | --        | 1.3       | --   | -- | --  |      |
| White spruce             | 12.0                    | --     | 1.7     | 10.3    | --      | --       | --        | --        | --   | -- | --  |      |
| Black spruce             | 30.5                    | 1.5    | 2.6     | 17.4    | 7.9     | 1.1      | --        | --        | --   | -- | --  |      |
| Northern white-cedar     | 24.4                    | --     | 0.0     | 1.9     | 4.0     | 5.7      | 10.8      | --        | --   | -- | 2.0 |      |
| Tamarack                 | 17.3                    | 2.4    | 2.8     | 4.5     | 4.9     | 2.7      | --        | --        | --   | -- | --  |      |
| Oak-hickory              | 17.9                    | 3.2    | 0.3     | 11.0    | 3.4     | --       | --        | --        | --   | -- | --  |      |
| Elm-ash-soft maple       | 59.2                    | 1.6    | 5.6     | 20.2    | 20.7    | 6.4      | 2.4       | 2.3       | --   | -- | --  |      |
| Maple-beech-birch        | 284.6                   | 15.1   | 17.4    | 86.4    | 112.7   | 32.2     | 9.8       | 7.6       | --   | -- | 3.4 |      |
| Aspen                    | 190.7                   | 79.8   | 42.3    | 53.0    | 15.6    | --       | --        | --        | --   | -- | --  |      |
| Paper birch              | 29.4                    | 2.3    | 2.9     | 20.8    | 1.0     | 2.4      | --        | --        | --   | -- | --  |      |
| Nonstocked               | 2.2                     | --     | --      | --      | 2.2     | --       | --        | --        | --   | -- | --  |      |
| All forest types         | 766.0                   | 130.5  | 95.1    | 266.0   | 182.8   | 52.0     | 23.0      | 11.2      | --   | -- | 5.4 |      |
| Nicolet                  |                         |        |         |         |         |          |           |           |      |    |     |      |
| Jack pine                | 7.5                     | 1.6    | 1.7     | 4.2     | --      | --       | --        | --        | --   | -- | --  |      |
| Red pine                 | 38.7                    | 3.4    | 8.9     | 25.6    | 0.3     | 0.5      | --        | --        | --   | -- | --  |      |
| White pine               | 4.4                     | --     | --      | 1.6     | --      | 1.1      | 1.7       | --        | --   | -- | --  |      |
| Balsam fir               | 25.6                    | 4.5    | 7.7     | 4.7     | 6.6     | --       | 2.1       | --        | --   | -- | --  |      |
| White spruce             | 15.4                    | 0.8    | 3.2     | 9.4     | 2.0     | --       | 0.0       | --        | --   | -- | --  |      |
| Black spruce             | 28.8                    | 3.1    | 3.6     | 19.2    | 1.7     | --       | 1.2       | --        | --   | -- | --  |      |
| Northern white-cedar     | 29.2                    | --     | --      | 3.2     | 8.0     | 11.1     | 6.4       | --        | --   | -- | 0.5 |      |
| Tamarack                 | 6.3                     | --     | 2.3     | 1.6     | 2.4     | --       | 0.0       | --        | --   | -- | --  |      |
| Oak-hickory              | 9.8                     | --     | --      | 8.0     | 1.8     | --       | 0.0       | --        | --   | -- | --  |      |
| Elm-ash-soft maple       | 24.3                    | 4.6    | 3.8     | 6.9     | 3.3     | 3.9      | 1.8       | --        | --   | -- | --  |      |
| Maple-beech-birch        | 258.8                   | 8.7    | 14.2    | 124.0   | 71.0    | 25.9     | 12.3      | 0.8       | --   | -- | 1.9 |      |
| Aspen                    | 127.9                   | 42.6   | 32.4    | 40.7    | 12.2    | --       | --        | --        | --   | -- | --  |      |
| Paper birch              | 20.2                    | 3.6    | 3.7     | 9.5     | 3.4     | --       | --        | --        | --   | -- | --  |      |
| Balsam poplar            | 0.2                     | 0.2    | --      | --      | --      | --       | --        | --        | --   | -- | --  |      |
| Nonstocked               | 2.3                     | 0.4    | --      | --      | --      | --       | --        | --        | --   | -- | 1.9 |      |
| All forest types         | 599.4                   | 73.5   | 81.5    | 258.6   | 112.7   | 42.5     | 25.5      | 0.8       | --   | -- | 4.3 |      |
| Total                    | 1365.4                  | 204.0  | 176.6   | 524.6   | 295.5   | 94.5     | 48.5      | 12.0      | --   | -- | 9.7 |      |

Table 10. -- Net volume of sawtimber on timberland by species group and diameter class, Chequamegon, 1996

(In thousand board feet)<sup>1</sup>

| Species group        | All classes | Diameter class (inches at breast height) |             |             |             |             |             |             |        |    |  |
|----------------------|-------------|------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|--------|----|--|
|                      |             | 9.0 - 10.9                               | 11.0 - 12.9 | 13.0 - 14.9 | 15.0 - 16.9 | 17.0 - 18.9 | 19.0 - 20.9 | 21.0 - 28.9 | 29.0+  |    |  |
| Softwoods            |             |                                          |             |             |             |             |             |             |        |    |  |
| Jack pine            | 68,871      | 28,116                                   | 23,484      | 14,239      | 1,135       | --          | 1,897       | --          | --     | -- |  |
| Red pine             | 306,068     | 62,114                                   | 99,749      | 57,102      | 36,469      | 29,051      | 13,445      | 8,138       | --     | -- |  |
| White pine           | 197,868     | 6,605                                    | 13,436      | 24,244      | 28,363      | 32,749      | 38,733      | 41,062      | 12,676 | -- |  |
| White spruce         | 127,992     | 33,399                                   | 37,786      | 25,216      | 10,937      | 10,464      | 4,453       | 5,737       | --     | -- |  |
| Black spruce         | 26,317      | 10,956                                   | 4,268       | 1,238       | 4,230       | 1,603       | 4,022       | --          | --     | -- |  |
| Balsam fir           | 73,240      | 38,970                                   | 21,712      | 8,615       | 2,751       | --          | 1,192       | --          | --     | -- |  |
| Hemlock              | 193,096     | 11,868                                   | 20,159      | 27,397      | 33,454      | 25,367      | 28,390      | 40,961      | 5,500  | -- |  |
| Tamarack             | 40,458      | 19,640                                   | 13,770      | 2,667       | 1,059       | 2,109       | 1,213       | --          | --     | -- |  |
| Northern white-cedar | 232,308     | 80,916                                   | 80,666      | 44,745      | 10,218      | 8,637       | 4,195       | 2,931       | --     | -- |  |
| Total softwoods      | 1,266,218   | 292,584                                  | 315,030     | 205,463     | 128,616     | 109,980     | 97,540      | 98,829      | 18,176 | -- |  |
| Hardwoods            |             |                                          |             |             |             |             |             |             |        |    |  |
| Select white oak     | 644         | --                                       | 644         | --          | --          | --          | --          | --          | --     | -- |  |
| Select red oak       | 168,812     | --                                       | 41,675      | 48,288      | 26,696      | 21,813      | 8,419       | 21,921      | --     | -- |  |
| Other hickory        | 1,746       | --                                       | 512         | 1,234       | --          | --          | --          | --          | --     | -- |  |
| Basswood             | 158,436     | --                                       | 55,377      | 48,754      | 28,601      | 18,067      | 3,604       | 4,033       | --     | -- |  |
| Yellow birch         | 87,504      | --                                       | 22,347      | 26,984      | 14,582      | 8,957       | 7,274       | 7,360       | --     | -- |  |
| Hard maple           | 308,581     | --                                       | 108,532     | 82,272      | 52,709      | 29,959      | 19,689      | 15,420      | --     | -- |  |
| Soft maple           | 225,702     | --                                       | 82,219      | 57,518      | 31,360      | 23,646      | 7,599       | 18,619      | 4,741  | -- |  |
| Elm                  | 13,056      | --                                       | 3,706       | 3,292       | --          | 2,238       | 1,368       | 950         | 1,502  | -- |  |
| Black ash            | 44,205      | --                                       | 24,350      | 12,131      | 4,911       | 997         | 1,816       | --          | --     | -- |  |
| White & green ash    | 74,300      | --                                       | 20,425      | 22,041      | 14,060      | 14,362      | 1,600       | 1,812       | --     | -- |  |
| Bigtooth aspen       | 124,879     | --                                       | 48,264      | 36,208      | 28,063      | 8,279       | 4,065       | --          | --     | -- |  |
| Quaking aspen        | 184,991     | --                                       | 78,216      | 59,754      | 25,482      | 15,086      | 6,453       | --          | --     | -- |  |
| Paper birch          | 77,006      | --                                       | 48,080      | 18,072      | 6,507       | 4,347       | --          | --          | --     | -- |  |
| Black cherry         | 652         | --                                       | 652         | --          | --          | --          | --          | --          | --     | -- |  |
| Other hardwoods      | 748         | --                                       | 748         | --          | --          | --          | --          | --          | --     | -- |  |
| Total hardwoods      | 1,471,262   | --                                       | 535,747     | 416,548     | 232,971     | 147,751     | 61,887      | 70,115      | 6,243  | -- |  |
| All species          | 2,737,480   | 292,584                                  | 850,777     | 622,011     | 361,587     | 257,731     | 159,427     | 168,944     | 24,419 | -- |  |

<sup>1</sup>International 1/4-inch rule.

Table 10a. -- Net volume of sawtimber on timberland by species group and diameter class, Nicolet, 1996

(In thousand board feet)<sup>1</sup>

| Species group        | All classes | Diameter class (inches at breast height) |             |             |             |             |             |             |    |    |    | 29.0+  |
|----------------------|-------------|------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|----|----|----|--------|
|                      |             | 9.0 - 10.9                               | 11.0 - 12.9 | 13.0 - 14.9 | 15.0 - 16.9 | 17.0 - 18.9 | 19.0 - 20.9 | 21.0 - 28.9 |    |    |    |        |
| Softwoods            |             |                                          |             |             |             |             |             |             |    |    |    |        |
| Jack pine            | 15,646      | 8,389                                    | 5,683       | 1,339       | 235         | --          | --          | --          | -- | -- | -- | --     |
| Red pine             | 327,299     | 69,355                                   | 106,831     | 83,354      | 25,338      | 15,395      | 11,695      | 15,331      | -- | -- | -- | --     |
| White pine           | 100,553     | 2,110                                    | 4,948       | 7,228       | 6,788       | 5,271       | 10,992      | 59,169      | -- | -- | -- | 4,047  |
| White spruce         | 124,620     | 36,626                                   | 36,324      | 20,341      | 13,904      | 10,124      | 3,988       | 3,313       | -- | -- | -- | --     |
| Black spruce         | 19,338      | 8,553                                    | 1,753       | 3,192       | 2,438       | 1,328       | 2,074       | --          | -- | -- | -- | --     |
| Balsam fir           | 60,062      | 30,634                                   | 23,421      | 4,004       | 2,003       | --          | --          | --          | -- | -- | -- | --     |
| Hemlock              | 213,170     | 12,187                                   | 28,600      | 33,644      | 33,467      | 31,367      | 33,772      | 34,880      | -- | -- | -- | 5,253  |
| Tamarack             | 24,467      | 9,305                                    | 6,826       | 5,368       | 1,159       | --          | 1,809       | --          | -- | -- | -- | --     |
| Northern white-cedar | 133,075     | 51,137                                   | 51,291      | 22,017      | 4,124       | 2,394       | --          | 2,112       | -- | -- | -- | --     |
| Total softwoods      | 1,018,230   | 228,296                                  | 265,677     | 180,487     | 89,456      | 65,879      | 64,330      | 114,805     | -- | -- | -- | 9,300  |
| Hardwoods            |             |                                          |             |             |             |             |             |             |    |    |    |        |
| Select red oak       | 76,075      | --                                       | 14,265      | 26,954      | 10,287      | 11,016      | 8,509       | 5,044       | -- | -- | -- | --     |
| Other red oak        | 1,781       | --                                       | --          | --          | --          | 1,781       | --          | --          | -- | -- | -- | --     |
| Basswood             | 222,981     | --                                       | 88,234      | 60,010      | 43,463      | 10,111      | 9,112       | 12,051      | -- | -- | -- | --     |
| Beech                | 2,913       | --                                       | --          | --          | --          | --          | 2,913       | --          | -- | -- | -- | --     |
| Yellow birch         | 59,894      | --                                       | 8,808       | 9,786       | 12,228      | 12,405      | 8,358       | 8,309       | -- | -- | -- | --     |
| Hard maple           | 452,824     | --                                       | 119,163     | 68,960      | 59,068      | 68,812      | 52,221      | 76,911      | -- | -- | -- | 7,689  |
| Soft maple           | 57,182      | --                                       | 26,662      | 15,379      | 8,962       | 928         | 3,243       | 2,008       | -- | -- | -- | --     |
| Elm                  | 3,113       | --                                       | 1,238       | --          | 1,257       | 618         | --          | --          | -- | -- | -- | --     |
| Black ash            | 6,627       | --                                       | 2,657       | 3,204       | 766         | --          | --          | --          | -- | -- | -- | --     |
| White & green ash    | 42,787      | --                                       | 8,400       | 17,903      | 5,395       | 8,672       | 2,417       | --          | -- | -- | -- | --     |
| Balsam poplar        | 15,716      | --                                       | 1,683       | 9,122       | 1,595       | 3,316       | --          | --          | -- | -- | -- | --     |
| Bigtooth aspen       | 86,260      | --                                       | 26,877      | 33,477      | 17,714      | 6,742       | 1,450       | --          | -- | -- | -- | --     |
| Quaking aspen        | 212,431     | --                                       | 85,637      | 64,575      | 35,266      | 16,670      | 8,255       | 2,028       | -- | -- | -- | --     |
| Paper birch          | 44,319      | --                                       | 17,910      | 9,906       | 10,661      | 5,842       | --          | --          | -- | -- | -- | --     |
| Black cherry         | 21,954      | --                                       | 6,742       | 9,469       | 3,823       | 1,920       | --          | --          | -- | -- | -- | --     |
| Other hardwoods      | 1,741       | --                                       | --          | --          | 818         | 923         | --          | --          | -- | -- | -- | --     |
| Total hardwoods      | 1,308,598   | --                                       | 408,276     | 328,745     | 211,303     | 149,756     | 96,478      | 106,351     | -- | -- | -- | 7,689  |
| All species          | 2,326,828   | 228,296                                  | 673,953     | 509,232     | 300,759     | 215,635     | 160,808     | 221,156     | -- | -- | -- | 16,989 |

<sup>1</sup>International 1/4-inch rule.

Table 11.--Net volume of all live trees and salvageable dead trees on timberland  
by class of timber and major species group, Chequamegon, 1996

(In thousand cubic feet)

|                           | All<br>species | Major species group |                    |                   |                   |
|---------------------------|----------------|---------------------|--------------------|-------------------|-------------------|
|                           |                | Pine                | Other<br>softwoods | Soft<br>hardwoods | Hard<br>hardwoods |
| Live trees                |                |                     |                    |                   |                   |
| Growing stock trees       |                |                     |                    |                   |                   |
| Sawtimber                 |                |                     |                    |                   |                   |
| Sawlog portion            | 448,646        | 97,577              | 116,083            | 132,669           | 102,317           |
| Upper stem portion        | 124,892        | 11,935              | 17,116             | 54,964            | 40,877            |
| Total                     | 573,538        | 109,512             | 133,199            | 187,633           | 143,194           |
| Poletimber                | 442,263        | 22,343              | 68,833             | 213,487           | 137,600           |
| All growing-stock trees   | 1,015,801      | 131,855             | 202,032            | 401,120           | 280,794           |
| Cull trees                |                |                     |                    |                   |                   |
| Short-log trees           | 16,894         | 258                 | 4,392              | 5,942             | 6,302             |
| Rough trees <sup>1</sup>  |                |                     |                    |                   |                   |
| Sawtimber size            | 27,383         | 605                 | 5,045              | 12,183            | 9,550             |
| Poletimber size           | 39,291         | 964                 | 3,549              | 20,924            | 13,854            |
| Total                     | 66,674         | 1,569               | 8,594              | 33,107            | 23,404            |
| Rotten trees <sup>1</sup> |                |                     |                    |                   |                   |
| Sawtimber size            | 16,201         | 118                 | 5,100              | 8,320             | 2,663             |
| Poletimber size           | 6,675          | --                  | 754                | 4,152             | 1,769             |
| Total                     | 22,876         | 118                 | 5,854              | 12,472            | 4,432             |
| All cull trees            | 106,444        | 1,945               | 18,840             | 51,521            | 34,138            |
| All live trees            | 1,122,245      | 133,800             | 220,872            | 452,641           | 314,932           |
| Salvable dead trees       |                |                     |                    |                   |                   |
| Sawtimber size            | 7,837          | 418                 | 2,086              | 4,506             | 827               |
| Poletimber size           | 8,187          | 180                 | 1,538              | 5,215             | 1,254             |
| All salvable dead trees   | 16,024         | 598                 | 3,624              | 9,721             | 2,081             |
| All classes               | 1,138,269      | 134,398             | 224,496            | 462,362           | 317,013           |

<sup>1</sup>Includes all noncommercial species.

Table 11a.--Net volume of all live trees and salvageable dead trees on timberland  
by class of timber and major species group, Nicolet, 1996

(In thousand cubic feet)

|                           | All<br>species | Major species group |                    |                   |                   |
|---------------------------|----------------|---------------------|--------------------|-------------------|-------------------|
|                           |                | Pine                | Other<br>softwoods | Soft<br>hardwoods | Hard<br>hardwoods |
| Live trees                |                |                     |                    |                   |                   |
| Growing stock trees       |                |                     |                    |                   |                   |
| Sawtimber                 |                |                     |                    |                   |                   |
| Sawlog portion            | 381,325        | 75,969              | 96,626             | 107,704           | 101,026           |
| Upper stem portion        | 103,239        | 7,916               | 14,060             | 43,467            | 37,796            |
| Total                     | 484,564        | 83,885              | 110,686            | 151,171           | 138,822           |
| Poletimber                | 399,156        | 14,191              | 75,159             | 174,761           | 135,045           |
| All growing-stock trees   | 883,720        | 98,076              | 185,845            | 325,932           | 273,867           |
| Cull trees                |                |                     |                    |                   |                   |
| Short-log trees           | 12,484         | 177                 | 1,680              | 4,942             | 5,685             |
| Rough trees <sup>1</sup>  |                |                     |                    |                   |                   |
| Sawtimber size            | 10,369         | 380                 | 1,774              | 3,069             | 5,146             |
| Poletimber size           | 15,310         | 183                 | 1,363              | 7,370             | 6,394             |
| Total                     | 25,679         | 563                 | 3,137              | 10,439            | 11,540            |
| Rotten trees <sup>1</sup> |                |                     |                    |                   |                   |
| Sawtimber size            | 7,189          | 28                  | 1,320              | 4,058             | 1,783             |
| Poletimber size           | 2,984          | --                  | 193                | 2,244             | 547               |
| Total                     | 10,173         | 28                  | 1,513              | 6,302             | 2,330             |
| All cull trees            | 48,336         | 768                 | 6,330              | 21,683            | 19,555            |
| All live trees            | 932,056        | 98,844              | 192,175            | 347,615           | 293,422           |
| Salvable dead trees       |                |                     |                    |                   |                   |
| Sawtimber size            | 10,983         | 580                 | 3,447              | 5,618             | 1,338             |
| Poletimber size           | 12,585         | --                  | 2,857              | 7,648             | 2,080             |
| All salvable dead trees   | 23,568         | 580                 | 6,304              | 13,266            | 3,418             |
| All classes               | 955,624        | 99,424              | 198,479            | 360,881           | 296,840           |

<sup>1</sup>Includes all noncommercial species.

Table 12. -- Average net annual growth of growing stock and sawtimber on timberland by Forest and major species group, Chequamegon-Nicolet National Forest, 1983-1995

| Land base   | Growing stock |                                 |                 |                |                | Sawtimber   |                                              |                 |                |                |
|-------------|---------------|---------------------------------|-----------------|----------------|----------------|-------------|----------------------------------------------|-----------------|----------------|----------------|
|             | All species   | Major species group             |                 |                |                | All species | Major species group                          |                 |                |                |
|             |               | Pine                            | Other softwoods | Soft hardwoods | Hard hardwoods |             | Pine                                         | Other softwoods | Soft hardwoods | Hard hardwoods |
|             |               | <i>(In thousand cubic feet)</i> |                 |                |                |             | <i>(In thousand board feet)</i> <sup>1</sup> |                 |                |                |
| Chequamegon | 23,761        | 3,742                           | 3,727           | 9,754          | 6,538          | 98,985      | 21,906                                       | 19,099          | 33,913         | 24,067         |
| Nicolet     | 20,509        | 3,340                           | 3,255           | 6,649          | 7,265          | 79,179      | 16,860                                       | 13,782          | 24,748         | 23,789         |
| Total       | 44,270        | 7,082                           | 6,982           | 16,403         | 13,803         | 178,164     | 38,766                                       | 32,881          | 58,661         | 47,856         |

<sup>1</sup> International 1/4-inch rule.

Table 13. -- Average net annual removals of growing stock and sawtimber on timberland by Forest and major species group, Chequamegon-Nicolet National Forest, 1983-1995

| Land base   | Growing stock |                                 |                 |                |                | Sawtimber   |                                 |                 |                |                |
|-------------|---------------|---------------------------------|-----------------|----------------|----------------|-------------|---------------------------------|-----------------|----------------|----------------|
|             | All species   | Major species group             |                 |                |                | All species | Major species group             |                 |                |                |
|             |               | Pine                            | Other softwoods | Soft hardwoods | Hard hardwoods |             | Pine                            | Other softwoods | Soft hardwoods | Hard hardwoods |
|             |               | <i>(In thousand cubic feet)</i> |                 |                |                |             | <i>(In thousand board feet)</i> |                 |                |                |
| Chequamegon | 13,254        | 1,972                           | 2,165           | 6,405          | 2,712          | 23,594      | 5,814                           | 5,769           | 9,545          | 2,466          |
| Nicolet     | 11,543        | 2,155                           | 1,375           | 5,713          | 2,300          | 30,271      | 8,635                           | 2,796           | 14,546         | 4,294          |
| Total       | 24,797        | 4,127                           | 3,540           | 12,118         | 5,012          | 53,865      | 14,449                          | 8,565           | 24,091         | 6,760          |

International 1/4-inch rule.

Table 14. -- Average net annual growth, average annual mortality, and average annual removals of growing stock and sawtimber on timberland by species group, Chequamegon, 1983-1995

| Species group        | Growing stock                   |                          |                         | Sawtimber                                    |                          |                         |
|----------------------|---------------------------------|--------------------------|-------------------------|----------------------------------------------|--------------------------|-------------------------|
|                      | Average net annual growth       | Average annual mortality | Average annual removals | Average net annual growth                    | Average annual mortality | Average annual removals |
|                      | <i>(In thousand cubic feet)</i> |                          |                         | <i>(In thousand board feet)</i> <sup>1</sup> |                          |                         |
| <b>Softwoods</b>     |                                 |                          |                         |                                              |                          |                         |
| Jack pine            | 171                             | 561                      | 915                     | 2,389                                        | 2,051                    | 2,689                   |
| Red pine             | 2,666                           | 24                       | 1,017                   | 14,074                                       | 126                      | 3,014                   |
| White pine           | 905                             | 149                      | 40                      | 5,443                                        | 701                      | 111                     |
| White spruce         | 1,865                           | 105                      | 1,071                   | 7,569                                        | 433                      | 2,988                   |
| Black spruce         | 260                             | 266                      | 218                     | 230                                          | 473                      | 415                     |
| Balsam fir           | 257                             | 1,461                    | 699                     | 3,171                                        | 3,015                    | 2,366                   |
| Hemlock              | 453                             | 209                      | --                      | 2,630                                        | 1,129                    | --                      |
| Tamarack             | 270                             | 129                      | --                      | 1,323                                        | 347                      | --                      |
| Northern white-cedar | 622                             | 489                      | 177                     | 4,176                                        | 2,271                    | --                      |
| Total softwoods      | 7,469                           | 3,393                    | 4,137                   | 41,005                                       | 10,546                   | 11,583                  |
| <b>Hardwoods</b>     |                                 |                          |                         |                                              |                          |                         |
| Select white oak     | 24                              | 316                      | --                      | 47                                           | 549                      | --                      |
| Select red oak       | 1,337                           | 61                       | 1,390                   | 6,316                                        | --                       | 468                     |
| Other red oak        | 25                              | 1                        | 29                      | --                                           | 2                        | --                      |
| Other hickory        | 16                              | 247                      | 35                      | 223                                          | 599                      | --                      |
| Basswood             | 869                             | 353                      | 529                     | 4,745                                        | 1,109                    | 776                     |
| Yellow birch         | 196                             | 494                      | 85                      | 1,049                                        | 674                      | 108                     |
| Hard maple           | 4,208                           | 695                      | 1,041                   | 12,961                                       | 974                      | 1,603                   |
| Soft maple           | 3,289                           | 249                      | 671                     | 8,528                                        | 689                      | 1,757                   |
| Elm                  | -69                             | 322                      | 177                     | -39                                          | 607                      | 506                     |
| Black ash            | 790                             | 42                       | 439                     | 1,300                                        | 105                      | 568                     |
| White & green ash    | 744                             | 555                      | 132                     | 3,417                                        | 1,609                    | 287                     |
| Bigtooth aspen       | 1,122                           | 1,935                    | 2,098                   | 6,680                                        | 3,588                    | 3,504                   |
| Quaking aspen        | 3,077                           | 916                      | 2,010                   | 10,748                                       | 1,282                    | 2,139                   |
| Paper birch          | 617                             | 13                       | 481                     | 1,936                                        | 2                        | 295                     |
| Black cherry         | 47                              | --                       | --                      | 15                                           | --                       | --                      |
| Other hardwoods      | --                              | --                       | --                      | 54                                           | --                       | --                      |
| Total hardwoods      | 16,292                          | 6,199                    | 9,117                   | 57,980                                       | 11,789                   | 12,011                  |
| All species          | 23,761                          | 9,592                    | 13,254                  | 98,985                                       | 22,335                   | 23,594                  |

<sup>1</sup>International 1/4-inch rule.

Table 14a. -- Average net annual growth, average annual mortality, and average annual removals of growing stock and sawtimber on timberland by species group, Nicolet, 1983-1995

| Species group        | Growing stock             |                          |                         | Sawtimber                             |                          |                         |
|----------------------|---------------------------|--------------------------|-------------------------|---------------------------------------|--------------------------|-------------------------|
|                      | Average net annual growth | Average annual mortality | Average annual removals | Average net annual growth             | Average annual mortality | Average annual removals |
|                      | (In thousand cubic feet)  |                          |                         | (In thousand board feet) <sup>1</sup> |                          |                         |
| <b>Softwoods</b>     |                           |                          |                         |                                       |                          |                         |
| Jack pine            | 66                        | 137                      | 711                     | 665                                   | 313                      | 1,346                   |
| Red pine             | 2,797                     | 74                       | 370                     | 13,715                                | 316                      | 1,645                   |
| White pine           | 477                       | 70                       | 1,074                   | 2,480                                 | 372                      | 5,644                   |
| White spruce         | 1,733                     | 171                      | 169                     | 7,157                                 | 881                      | 720                     |
| Black spruce         | -102                      | 517                      | 165                     | -460                                  | 690                      | --                      |
| Balsam fir           | 321                       | 1,465                    | 928                     | 781                                   | 3,078                    | 1,509                   |
| Hemlock              | 454                       | 172                      | 108                     | 2,969                                 | 914                      | 567                     |
| Tamarack             | 114                       | 141                      | --                      | 360                                   | 418                      | --                      |
| Northern white-cedar | 735                       | 337                      | 5                       | 2,975                                 | 1,492                    | --                      |
| Total softwoods      | 6,595                     | 3,084                    | 3,530                   | 30,642                                | 8,474                    | 11,431                  |
| <b>Hardwoods</b>     |                           |                          |                         |                                       |                          |                         |
| Select white oak     | 18                        | --                       | --                      | --                                    | --                       | --                      |
| Select red oak       | 703                       | 108                      | 83                      | 3,757                                 | 278                      | 105                     |
| Other red oak        | 25                        | 3                        | --                      | 57                                    | 4                        | --                      |
| Basswood             | 1,254                     | 639                      | 212                     | 7,921                                 | 1,183                    | 725                     |
| Beech                | 29                        | 2                        | --                      | 67                                    | 6                        | --                      |
| Yellow birch         | -21                       | 282                      | 265                     | -42                                   | 666                      | 857                     |
| Hard maple           | 6,122                     | 514                      | 1,703                   | 18,218                                | 1,107                    | 2,815                   |
| Soft maple           | 1,369                     | 207                      | 628                     | 2,028                                 | 227                      | 685                     |
| Elm                  | -436                      | 703                      | 545                     | -869                                  | 1,222                    | 1,547                   |
| Black ash            | 287                       | 105                      | --                      | 248                                   | 174                      | --                      |
| White & green ash    | 488                       | 13                       | 190                     | 1,930                                 | 34                       | 407                     |
| Balsam poplar        | 146                       | 82                       | 84                      | 451                                   | 293                      | 402                     |
| Bigtooth aspen       | 582                       | 318                      | 313                     | 2,910                                 | 1,173                    | 999                     |
| Quaking aspen        | 2,990                     | 2,059                    | 2,914                   | 9,508                                 | 3,430                    | 8,399                   |
| Paper birch          | 172                       | 930                      | 815                     | 1,615                                 | 1,071                    | 1,344                   |
| Black cherry         | 244                       | 101                      | 261                     | 912                                   | 34                       | 555                     |
| Other hardwoods      | -58                       | 65                       | --                      | -174                                  | 193                      | --                      |
| Total hardwoods      | 13,914                    | 6,131                    | 8,013                   | 48,537                                | 11,095                   | 18,840                  |
| All species          | 20,509                    | 9,215                    | 11,543                  | 79,179                                | 19,569                   | 30,271                  |

<sup>1</sup>International 1/4-inch rule.

Table 15.--Volume of sawtimber on timberland by species group and butt log grade or tree grade,  
Chequamegon, 1996

| Species              | Total     | Log grade |         |           |              |
|----------------------|-----------|-----------|---------|-----------|--------------|
|                      |           | 1         | 2       | 3         | 4            |
| Softwoods            |           |           |         |           |              |
| Jack pine            | 68,871    | --        | 477     | 68,394    | --           |
| Red pine             | 306,068   | 10,890    | 12,994  | 282,184   | --           |
| White pine           | 197,868   | 50,200    | 51,926  | 89,766    | 5,975        |
| White spruce         | 127,992   | --        | 5,242   | 122,750   | --           |
| Black spruce         | 26,317    | --        | 1,684   | 24,633    | --           |
| Balsam fir           | 73,240    | --        | --      | 73,240    | --           |
| Hemlock              | 193,096   | 53,792    | 43,369  | 95,935    | --           |
| Tamarack             | 40,458    | --        | --      | 40,458    | --           |
| Northern white-cedar | 232,308   | 1,158     | 37,269  | 193,881   | --           |
| Total                | 1,266,218 | 116,041   | 152,961 | 991,241   | 5,975        |
| Tree grade           |           |           |         |           |              |
| Species              | Total     | 1         | 2       | 3         | Tie & timber |
| Hardwoods            |           |           |         |           |              |
| Select white oak     | 644       | --        | --      | 644       | --           |
| Select red oak       | 168,812   | 41,668    | 70,687  | 55,527    | 930          |
| Other hickory        | 1,746     | --        | 612     | 1,134     | --           |
| Basswood             | 158,436   | 45,674    | 61,393  | 49,467    | 1,903        |
| Yellow birch         | 87,504    | 17,162    | 32,613  | 36,013    | 1,716        |
| Hard maple           | 308,581   | 46,913    | 86,083  | 156,739   | 18,846       |
| Soft maple           | 225,702   | 24,818    | 80,155  | 109,378   | 11,351       |
| Elm                  | 13,056    | --        | --      | 13,056    | --           |
| Black ash            | 44,205    | 4,913     | 9,641   | 23,246    | 6,405        |
| White & green ash    | 74,300    | 22,243    | 28,430  | 20,222    | 3,405        |
| Bigtooth aspen       | 124,879   | 5,158     | 47,767  | 69,687    | 2,267        |
| Quaking aspen        | 184,991   | 9,037     | 44,972  | 120,053   | 10,929       |
| Paper birch          | 77,006    | --        | 27,110  | 48,380    | 1,516        |
| Black cherry         | 652       | --        | 652     | --        | --           |
| Other hardwood       | 748       | --        | --      | 748       | --           |
| Total                | 1,471,262 | 217,586   | 490,115 | 704,292   | 59,269       |
| All species          | 2,737,480 | 333,627   | 643,076 | 1,695,533 | 65,244       |

Table 15a.--Volume of sawtimber on timberland by species group and butt log grade or tree grade,  
Nicolet, 1996

| Species              | Total     | Log grade |         |           |              |
|----------------------|-----------|-----------|---------|-----------|--------------|
|                      |           | 1         | 2       | 3         | 4            |
| Softwoods            |           |           |         |           |              |
| Jack pine            | 15,646    | --        | --      | 15,646    | --           |
| Red pine             | 327,299   | 28,584    | 6,727   | 291,988   | --           |
| White pine           | 100,553   | 13,088    | 21,341  | 53,844    | 12,279       |
| White spruce         | 124,620   | --        | 2,686   | 121,934   | --           |
| Black spruce         | 19,338    | --        | --      | 19,338    | --           |
| Balsam fir           | 60,062    | --        | --      | 60,062    | --           |
| Hemlock              | 213,170   | 4,308     | 60,027  | 148,836   | --           |
| Tamarack             | 24,467    | --        | --      | 24,467    | --           |
| Northern white-cedar | 133,075   | --        | 10,683  | 122,392   | --           |
| Total softwoods      | 1,018,230 | 45,980    | 101,464 | 858,507   | 12,279       |
| Tree grade           |           |           |         |           |              |
| Species              | Total     | 1         | 2       | 3         | Tie & timber |
| Hardwoods            |           |           |         |           |              |
| Select red oak       | 76,075    | 5,405     | 41,841  | 22,100    | 6,729        |
| Other red oak        | 1,781     | --        | --      | --        | 1,781        |
| Basswood             | 222,981   | 61,439    | 86,428  | 75,114    | --           |
| Beech                | 2,913     | --        | 2,913   | --        | --           |
| Yellow birch         | 59,894    | 14,986    | 17,240  | 24,383    | 3,285        |
| Hard maple           | 452,824   | 133,848   | 134,714 | 160,752   | 23,511       |
| Soft maple           | 57,182    | 2,122     | 16,548  | 34,522    | 3,990        |
| Elm                  | 3,113     | 796       | --      | 2,317     | --           |
| Black ash            | 6,627     | 1,279     | 5,348   | --        | --           |
| White & green ash    | 42,787    | 9,263     | 24,971  | 7,651     | 901          |
| Balsam poplar        | 15,716    | --        | --      | 7,982     | 7,734        |
| Bigtooth aspen       | 86,260    | 8,141     | 43,884  | 32,262    | 1,973        |
| Quaking aspen        | 212,431   | 9,039     | 44,131  | 131,368   | 27,894       |
| Paper birch          | 44,319    | 4,476     | 17,669  | 21,247    | 927          |
| Black cherry         | 21,954    | 2,526     | 11,011  | 8,417     | --           |
| Other hardwood       | 1,741     | 818       | --      | 923       | --           |
| Total hardwoods      | 1,308,598 | 254,137   | 446,699 | 529,038   | 78,724       |
| All species          | 2,326,828 | 300,117   | 548,163 | 1,387,544 | 91,003       |



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Haugen, David E.; Freeman, Phillip C.; Theisen, Mark A.

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The inventory of the forest resources of the Chequamegon-Nicolet National Forest reports 1.5 million acres of land, of which 1.4 million acres are forested. This bulletin presents statistical highlights and contains detailed tables of forest area as well as of timber volume, growth, removals, and mortality.

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**KEY WORDS:** Forest area, timber volume, growth, removals, mortality.



Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.

